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School of Dental and Oral Surgery

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TRANSACTIONS

OF THE

American Dental Association.

FIFTH ANNUAL MEETING

HELD IN CHICAGO, JULY 25TH TO JULY 28TH, INCLUSIVE, 1865,

AND

SIXTH ANNUAL MEETING

HELD IN BOSTON, JULY 31ST TO AUGUST 7TH, INCLUSIVE, 1866.

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1868.

DISCLAIMER.

The AMERICAN DENTAL ASSOCIATION, although formally accepting and publishing the reports of the various standing committees, and essays read before the Association, holds itself wholly irresponsible for the opinions, theories, or criticisms therein contained, except when so decided by special resolution. — *Constitution.*

Entered according to Act of Congress, in the year 1867, by the
AMERICAN DENTAL ASSOCIATION,
In the Clerk's Office of the District of Massachusetts.

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TRANSACTIONS

OF THE

AMERICAN DENTAL ASSOCIATION.

Fifth Annual Meeting,

HELD AT

CHICAGO, JULY 25, 1865.

TRANSACTIONS

OF THE

AMERICAN DENTAL ASSOCIATION.

The Fifth Annual Meeting of the AMERICAN DENTAL ASSOCIATION was held in the Opera House, Chicago, July 25, 1865.

The Association was called to order at 11½ o'clock, A.M., by the President, Dr. J. H. MCQUILLEN.

Prayer was offered by the Rev. Dr. HALSEY.

An Address of welcome and congratulation was then delivered, by Dr. W. W. ALLPORT, Chairman of the Committee of Arrangements.

Dr. T. P. ABELL also delivered an Address of welcome on behalf of the Western Dental Society.

The report of the Committee of Arrangements on credentials was called for, when it was presented as follows:

Your Committee of Arrangements would respectfully report, That we have examined the credentials of the following persons, and find them to be properly authenticated delegates to this Association.

Brooklyn Dental Society. — W. H. Atkinson, C. P. Fitch, G. A. Mills, W. C. Horne.

Buffalo Dental Association. — Geo. B. Snow.

Beaver Meadow Valley Dental Society. — T. J. Chandler.

Central States Dental Society. — W. H. Morgan, B. M. Gildea, G. B. Fittz, J. L. Nourse.

Cincinnati Dental Association. — H. A. Smith.

Connecticut Valley Dental Association. — W. H. Jones.

Central New York Dental Association. — J. E. Savery.

Connecticut State Dental Association. — W. W. Sheffield, A. Hill.

Chicago Dental Society. — J. C. Fuller, A. W. Freeman, M. W. Sherwood, J. A. Kennicott, E. R. E. Carpenter.

Delaware State Dental Association. — B. J. Bing.

Hartford Dental Society. — J. McManus.

Hudson Valley Dental Society. — J. N. Scranton.

Indiana State Dental Association. — M. Wells, D. M. Weld, J. Richardson, P. G. C. Hunt.

Illinois State Dental Society. — S. Babcock, A. C. Vansant, C. B. Rising, O. Wilson, M. S. Dean, A. E. Gibbs, E. H. Kilbourne, J. H. Young, N. R. Griswold, A. Ames, W. Ormsby, E. W. Parke.

Iowa State Dental Society. — E. L. Clarke, J. P. Porter, G. W. Nichols, H. S. Chase, N. H. Tulloss.

Kentucky State Dental Society. — W. D. Stone, W. G. Redman.

Louisville Dental Association. — W. H. Gates.

Merrimack Valley Dental Association. — A. Lawrence, G. A. Gerry, J. D. Kilbourne.

Massachusetts Dental Society. — L. D. Shepard, I. J. Wetherbee, B. S. Codman, H. F. Bishop, I. A. Salmon.

Mississippi Valley Dental Association. — W. H. Sedgwick, W. Taft, Geo. W. Keely, W. P. Horton.

Michigan Dental Association. — J. A. Watling, H. H. Jackson, J. A. Harris, Geo. L. Field, B. Bannister, C. B. Porter, G. W. Stone.

Mad River Valley Dental Association. — A. A. Blount, Geo. L. Paine, N. W. Williams.

Northern Ohio Dental Association. — C. C. Carroll, C. H. Harroun.

New Haven Dental Society. — J. H. Smith, E. Strong.

New York State Delegation. — J. A. Perkins.

New York Society of Dental Surgeons. — John Allen, W. C. Tinker.

Ohio Dental College Association. — A Berry, Geo. H. Cushing, J. C. Dean, Geo. Watt, A. S. Talbert.

Pennsylvania College of Dental Surgeons. — T. L. Buckingham.

Philadelphia Dental College. — J. H. McQuillen.

Pennsylvania Dental Association. — Spencer Roberts.

Southern New York and Northwestern Pennsylvania Dental Association. — J. C. Gifford.

St. Louis Dental Association. — W. N. Morrison, I. Forbes, H. E. Peebles, Henry Barron.

Western New York Dental Association. — A. P. Southwick, E. H. Danforth.

Western Dental Association. — S. L. Edwards, C. W. Rivers, H. N. Lewis, T. P. Abell, G. S. Miles, D. W. Perkins, J. W. Ellis.

Wabash Valley Dental Association. — J. Knapp, A. M. Moore.

W. W. Allport,
E. A. Bogue,
J. C. Dean,
Committee on Credentials.

The report was accepted and adopted.

The roll was now called, and the following persons answered to their names:

Old Members. — Drs. C. W. Spalding, J. H. McQuillen, T. L. Buckingham, G. A. Mills, C. P. Fitch, W. W. Allport, W. H. Atkinson, J. Taft, I. J. Wetherbee, Geo. Watt, J. Cheesbrough, J. A. Perkins, J. C. Dean, H. Barron, L. D. Shepard, G. B. Snow, J. McManus, W. O. Kulp, W. N. Morrison, I. Forbes, F. N. Seabury, E. A. Bogue, C. B. Porter, J. H. Smith, S. B. Noble, W. D. Stone, H. F. Bishop, T. P. Abell, H. E. Peebles, L. P. Haskill, E. Strong, B. M. Gildea, P. G. C. Hunt, A. Blake, John Allen, I. Harris, F. Y. Clark, S. G. Martin, C. R. Butler, A. B. Robbins, W. P. Horton, G. W. Stone, H. McCullum, A. S. Talbert, H. A. Smith, J. A. Watling, H. H. Jackson.

The following members were not present, but sent on their dues: J. Foster Flagg, G. W. Ellis, J. F. Johnston, B. Wood, and S. B. Palmer.

New Members. — Drs. Geo. H. Cushing, A. Hill, Geo. L. Paine, J. D. Kilbourne, N. W. Williams, W. Taft, G. W. Nichols, W. H. Sedgwick, C. C. Carroll, J. P. Porter, J. A. Harris, J. Knapp, A. P. Sayles, B. Bannister, G. S. Miles, G. L. Field, J. C. Fuller, I. A. Salmon, G. A. Gerry, C. B. Rising, A. Gibbs, A. Lawrence,

M. S. Dean, G. B. Fittz, A. Berry, J. C. Gifford, A. P. Southwick, W. C. Horne, J. L. Nourse, W. H. Gates, B. S. Codman, C. W. Rivers, H. S. Chase, W. W. Sheffield, W. H. Jones, S. Roberts, O. Wilson, C. H. Harroun, H. N. Lewis, W. C. Tinker, Geo. W. Keely, W. G. Redman, A. C. Vansant, J. H. Young, A. W. Freeman, J. A. Kennicott, E. R. E. Carpenter, E. L. Clarke, E. H. Danforth, T. J. Chandler, M. Wells, S. Babcock, N. R. Griswold, W. H. Morgan, S. L. Edwards, E. H. Kilbourne, A. Ames, W. W. Ormsby, A. A. Blount, D. M. Weld, J. N. Scranton, D. W. Perkins, J. E. Savery, A. M. Moore, J. W. Ellis, A. S. Talbert, S. B. Noble, M. Mills, J. B. Bing, G. W. Stone, J. Richardson, M. W. Sherwood.

On motion of Dr. SPALDING:

Resolved, That the physicians and dentists, residents in the city, and also any others who will be in Chicago during the sessions of the Association, are hereby invited to be present, and take seats with this body.

The selection of a Nominating Committee being now in order, the PRESIDENT appointed as that Committee Drs. Geo. Watt, I. Forbes, A. Lawrence, G. A. Mills, S. Roberts, J. McManus, C. P. Fitch, J. C. Dean, W. D. Stone.

The Committee of Arrangements reported the time of meeting and adjournment to be as follows:

Clinics, from 8 to 10 each day.

Morning session, from 10, A.M. to 1, P.M.

Afternoon session, from 3 to 7, P.M.

Adjourned to 3 o'clock, P.M.

FIRST DAY—Afternoon Session.

Association met and was called to order by the President at 3½ o'clock.

Minutes of the morning session were read and approved.

The new delegates now came forward, paid dues, and signed the Constitution.

The Nominating Committee, being called upon, made the following Report: for

President. — C. W. Spalding, of St. Louis; C. P. Fitch, of New York.

1*st Vice-President.* — Geo. H. Cushing, of Chicago; W. H. Morgan, of Nashville.

2*d Vice-President.* — J. McManus, of Hartford; H. A. Smith, of Cincinnati.

Corresponding Secretary. — A. S. Talbert, of Lexington, Ky.; L. D. Shepard, of Salem, Mass.

Recording Secretary. — J. Taft, of Cincinnati; W. C. Horne, of New York.

Treasurer. — I. J. Wetherbee, of Boston; O. Wilson, of Aurora, Ill.

The Report was accepted.

The election of officers for the ensuing year was now announced as the order of business.

The President appointed Drs. J. Cheesbrough and H. A. Smith as tellers.

Upon balloting, the following gentlemen were found to be elected officers of this Association:

President. — C. W. Spalding, of St. Louis, Missouri.

1*st Vice-President.* — Geo. H. Cushing, of Chicago, Ill.

2*d Vice-President.* — J. McManus, of Hartford, Conn.

Corresponding Secretary. — L. D. Shepard, of Salem, Mass.

Recording Secretary. — J. Taft, of Cincinnati, Ohio.

Treasurer. — I. J. Wetherbee, of Boston, Mass.

The President appointed Drs. Cushing and Fitch a Committee to escort the President elect to the chair, who, upon assuming the position, made some remarks expressing thanks for the honor conferred, and giving assurance of faithful endeavor to perform the duties devolving upon him in his new position.

The retiring President, Dr. McQuillen, delivered an eloquent extempore address, in which he gave an account of the development and progress of dental associative effort in the United States.

On motion of Dr. Noble, —

Resolved, That the thanks of the Association are hereby tendered to the retiring officers, for the very faithful manner in which they have discharged their duties.

Reports were called for, when the Treasurer presented his report. It is as follows:

I. J. Wetherbee in account with the American Dental Association.

Dr.

July 21, 1864. — To cash received of 88 members ($2 each)	$176 00
Annual assessments	18 00
	$194 00

Cr.

By cash paid for hall	$28 00
Blank book and sundries.	5 50
By cash paid Publication Committee as per order	160 50
	$194 00

Respectfully submitted.

I. J. WETHERBEE,

Treasurer American Dental Association.

The report was referred to an Auditing Committee, consisting of Drs. L. D. Shepard, S. B. Noble, T. L. Buckingham.

The reports of Standing Committees were now called for.

The Committee on Publication were granted further time.

The Committee on Prize Essays had no report.

The report on Dental Physiology was presented and read by Dr. C. P. Fitch, and referred to the Committee on Publication.

The discussion on the report was opened by Dr. Atkinson.

The following persons were appointed for clinics the next day, Wednesday, from 8 to 10 o'clock, A.M., viz: Drs. C. W. Spalding, W. H. Atkinson, J. Taft, I. J. Wetherbee.

On motion adjourned to Wednesday at 10 o'clock A.M.

SECOND DAY. — Morning Session.

Association met at 10 o'clock, A.M. Was called to order by the President.

The minutes of the last session were read and approved.

The Auditing Committee reported:

Your Committee, appointed to examine the account of the Treasurer, report that they have attended to their duty, and compared the same with the vouchers, and find it to be correct.

L. D. SHEPARD,
S. P. NOBLE,
T. L. BUCKINGHAM, } *Committee.*

The report was accepted, and Committee discharged.

On motion of Dr. J. W. ELLIS, —

Resolved, That the Publication Committee be instructed to publish the Constitution of the Association as amended, with the report of the proceedings of the present year. Carried.

On motion of Dr. J. A. PERKINS, —

Resolved, That Prof. J. H. MCQUILLEN be invited to deliver before this Association, a lecture on the Eye, at 12 o'clock.

On motion of Dr. RICHARDSON, —

Resolved, That it is the sense of the Association, that he who first promulgates, or publishes to the profession at large, any discovery, appliance or mode of practice, should be recognized as the originator of the same.

After some discussion, the resolution was laid upon the table.

The discussion upon the report of Dental Physiology was now resumed by Drs. MCQUILLEN, ATKINSON, FITCH, CHASE, and others.

The hour of twelve having arrived, further discussion upon the subject was suspended till after the delivery of Dr. McQuillen's lecture. After which the Association adjourned till 3 o'clock, P.M.

SECOND DAY. — Afternoon Session.

The Association met according to adjournment. The President in the chair.

The President announced the regular order of business to be a lecture by Dr. Hildreth, of the Government Eye and Ear Infirmary, of Chicago.

The Doctor gave a very interesting and instructive lecture upon the Pathological Conditions of the Eye, and the various modes of operating, and the treatment he employs.

On motion of Dr. FITCH,—

Resolved, That the thanks of the Association be extended to Dr. Hildreth for the very able lecture with which he has favored this body.

Minutes of the morning session were read and approved.

Discussion on the subject of Dental Physiology was resumed by Drs. CHASE, TAFT, WATT, NICHOLS, NCQUILLEN, HILL, ATKINSON, and BUCKINGHAM. Pending the discussion of this subject, Dr. BUCKINGHAM read a paper upon Cell Formation, and the Function of Cells in the Formation of Animal Tissues.

Drs. Spalding, Atkinson, Fitch, and McManus were announced as operators at the clinic to-morrow morning at 8 o'clock.

Dr. ALLPORT announced a lecture at 8 o'clock, P. M., by Prof. Brainard, on Specialties in Medicine. Also an invitation to an entertainment to be given by Prof. Miller, of this city, in the evening at 9 o'clock, at his residence.

The selection of the place of the next meeting of the Association was made the order of business for to-morrow, at 10 o'clock.

Adjourned till 8 o'clock this evening.

Association met at 8 o'clock, P.M.; was called to order by the President; after which Prof. BRAINARD, of Rush Medical College, proceeded to deliver an able and highly instructive address upon Specialties in Medicine, dwelling largely upon that of Dentistry.

The lecture was regarded as one of the most effective ever made upon that subject.

A copy was solicited for publication in the Transactions of the Association.

On motion, a vote of thanks was tendered to Dr. Brainard for the address.

Adjourned till to-morrow morning at 10 o'clock.

THIRD DAY. — Morning Session.

The Association met at 10.30 o'clock, A.M. President in the chair.

Minutes of the preceding meeting were read and approved.

The Association now proceeded to select a place for the next annual meeting.

After considerable discussion and due consideration, and a vote being taken (by ballot), Boston was chosen as the place of meeting.

The Treasurer made a statement in reference to finances, showing a deficiency in the Treasury, and that to meet the current expenses and publish the Transactions of the Association, it was necessary to raise an additional sum.

On motion of Dr. J. W. ELLIS, —

Resolved, That an assessment of $2.00 per member, additional, be made. Carried.

Dr. W. N. Morrison described a spittoon which he has had constructed, and finds it very valuable. He tenders it to the profession. It will be manufactured by S. S. White, at a cost of not more than $50.00.

On motion of Dr. PEEBLES, —

Resolved, That the diagram for an enameled iron spittoon, presented to the Association by Dr. Morrison, of St. Louis, be accepted, and a vote of thanks tendered to him for the same.

Dr. MCMANUS offered the following, which was adopted:

Whereas, This Association regard it as their duty to guard the public against the use of the various articles so extensively advertised as beneficial to the teeth, but which we deem injurious,—

Resolved, That a committee of five be appointed to prepare and present to this body, and the profession at large, such formula for dentifrice, as this Association judge proper for public use.

The President appointed for that committee Drs. McManus, Watt, Buckingham, Cheesbrough and Chase.

Dr. KULP asked to withdraw the amendment to the Constitution proposed by him last year.

Considerable discussion was had upon the propriety of withdrawal; and, upon a vote being taken, Association refused to grant Dr. Kulp's request.

The vote was then taken upon the amendment, which was lost.

Dr. PEEBLES moved the passage of the amendments to the Constitution, notice of which had been given by Dr. Spalding at the last annual meeting.

These were of Sec. 6, Art. 3; and in Sec. 2 (erroneously numbered 1), Art. 6; also in Sec. 3, Art. 6; and Sec. 1 and 6.—See proceedings of last annual meeting.

The regular order of business was now taken up.

The Committee on Dental Chemistry was called upon, but made no report.

The Committee on Dental Pathology and Surgery was called, when Dr. Atkinson read a report on the subject, interspersing it with explanatory remarks.

Dr. Cheesbrough read a paper upon "The Sympathy Existing between the Human Teeth and Viscera, especially the Gravid Uterus."

Adjourned till 3 o'clock, P. M.

THIRD DAY.—Afternoon Session.

Association convened according to adjournment. President in the chair.

Minutes of the morning session were read and approved.

Dr. BUCKINGHAM then read a paper written by Dr. George T. Barker, on Symmetrical Diseases of the Dental Organs.

After the reading of this paper, Dr. McQUILLEN described a case of mutilation of the face of a soldier, by a fragment of shell, and the method of reparation of parts.

Dr. CHEESBROUGH presented some beautiful specimens of

maxillary bones of the fœtus, at periods varying from six weeks to six months, describing them very minutely, and exhibiting them under a magnifier.

Dr. ATKINSON now addressed the Association at considerable length, upon the treatment of pathological conditions of the teeth and maxillary bones, discussing very minutely the principles involved.

Dr. SHEFFIELD presented necrosed portions of the inferior maxilla of a child six years of age. The case had been treated mainly by poulticing, and had received much injury from this treatment; simply upon the removal of the necrosed portion of bone, the parts were restored to health. The subject was further discussed, and cases presented by Drs. MORGAN, ATKINSON, D. W. STONE, FORBES and others.

An invitation was extended to the Association, through Dr. A. LAWRENCE, to visit a gallery of paintings in the city of Chicago; also an invitation through Dr. ALLPORT, from the Board of Public works, to visit the tunnel now being made under the lake; also an invitation to visit the Academy of Natural Sciences.

The invitations were accepted, and the thanks of the Association were extended to all these parties for the courtesy and kindness thus manifested.

Dr. F. Y. CLARK read a paper upon diseases of the dental pulp and their treatment.

Dr. WETHERBEE was granted permission to make some remarks explanatory of the Dental Protective Union, soliciting for it attention and consideration.

The members of the Association received an invitation, through the President, to attend an entertainment, to be given by Prof. N. S. Davis at his residence, in the evening, at 9 o'clock, previous to which Dr. McQuillen would deliver a lecture in the hall, upon the circulation of the blood.

Drs. Cheesbrough, McQuillen, Morgan, Hunt and Atkinson were announced as the operators for the morning clinic.

The Association adjourned till 8 o'clock, P.M.

THIRD DAY. — Evening Session.

Association met according to adjournment, when Dr. McQuillen proceeded to the delivery of the lecture announced prior to the adjournment of the afternoon session; after which some discussion was had upon some points presented in the address.

Adjourned till 10 o'clock to-morrow morning.

FOURTH DAY. — Morning Session.

Association met at 10 o'clock. President in the chair.

Minutes of the preceding meeting were read and approved.

Upon motion of Dr. D. W. Stone, —

Resolved, That the thanks of the Association are hereby extended to the reporters of the press of this city for the very faithful manner in which they have reported the transactions of this body.

Dr. John Allen read a paper on dental ethics, which subject was suggestively presented to this Association for its action by the New York Society of Dental Surgeons.

The paper was passed to the Publication Committee.

The report containing the nominations of Standing Committees was now presented, and is as follows, viz.:

Committee of Arrangements. — Drs. B. S. Codman, of Boston; L. D. Shepard, of Salem; and A. Lawrence, of Lowell.

Committee on Publication. — Drs. J. H. McQuillan, of Philadelphia; W. C. Horne, of New York; C. P. Fitch, of New York.

Committee on Prize Essays. — Drs. I. Forbes, of St. Louis; G. L. Paine, of Xenia, Ohio; I. J. Wetherbee, of Boston; T. L. Buckingham, of Philadelphia; A. S. Talbert, of Lexington, Ky.

Committee on Dental Physiology. — Drs. H. S. Chase, of Iowa City, Iowa; J. Cheesbrough, of Toledo, Ohio; W. H. Morgan, of Nashville, Tenn.

Committee on Dental Chemistry. — Drs. E. Wildman, of Philadelphia; H. A. Smith, of Cincinnati; T. L. Buckingham, of Philadelphia.

Committee on Dental Pathology and Surgery. — Drs. C. W. Spalding, of St. Louis; W. H. Atkinson, of New York; A. Lawrence, of Lowell; C. R. Butler, of Cleveland; W. Taft, of Cincinnati.

Committee on Operative Dentistry. — Drs. J. A. Kennicott, of Chicago; James McManus, of Hartford, Conn.; W. H. Allen, of New York.

Committee on Mechanical Dentistry. — Drs. J. Richardson, of Terre Haute, Ind.; B. T. Whitney, of Buffalo; Geo. L. Field, of Detroit; J. A. Perkins, of Albany; E. Strong, of New Haven.

Committee on Dental Education. — D. W. Perkins, of Milwaukie; G. A. Mills, of Brooklyn; L. D. Shepard, of Salem, Mass.

Committee on Dental Literature. — Drs. A. Hill, of Norwalk, Conn.; A. Berry, of Cincinnati; F. Y. Clark, of Savannah, Ga.

Committee on Volunteer Essays. — Drs. Geo. Watt, of Xenia, Ohio; J. W. Ellis, of Chicago; W. O. Kulp, of Muscatine, Ind.

The report was accepted and the nominations confirmed.

The Committee on Operative Dentistry was called upon, but had no report.

The subject of operative dentistry was now taken up, and discussed by Drs. Peebles, J. W. Ellis, C. P. Fitch, W. D. Stone, Kennicott, and Mills.

Dr. McQuillen, by permission, read a paper on dental manipulation.

The subject of operative dentistry was further discussed by Drs. Atkinson, Perkins, Hill and others.

Dr. Horne directed attention to the utility of Dr. Barnum's application of sheet rubber for excluding moisture from a tooth during the operation of filling.

Dr. M. Wells exhibited a small instrument, made of steel, for the purpose of clamping a roll of paper or cloth upon a tooth, to exclude moisture during filling.

The Association adjourned to 3 o'clock.

FOURTH DAY. — Afternoon Session.

The Association convened according to adjournment. President in the chair.

Minutes of the morning session read and approved.

Report of the Publication Committee.

Your Committee, in the discharge of their duty, have had printed two hundred and fifty copies of the Transactions of the sessions of this body for 1864; and bound two hundred copies, and distributed to the members of the Association entitled to them.

The following exhibits the cost of publishing Transactions; also, the receipts and disbursements by the Committee.

Publication Committee in account with the American Dental Association.

Dr.

To balance on hand at last report	$34 17
To amount received for sale of Transactions	6 00
To amount received of Treasurer	160 00
	$200 17

Cr.

By amount paid for publishing Transactions for 1864 .	$235 00
By postage and express	15 00
	$250 00
Balance due Committee	49 83

J. TAFT,

Chairman of Committee.

The report of the Committee was adopted, and the balance ordered to be paid.

Dr. Wetherbee not being present on account of sickness, Dr. J. C. Fuller was elected Treasurer *pro tempore.*

On motion of Dr. Perkins, —

Resolved, That the annual dues for next year be five dollars.

Dr. FORBES suggested that the funds for meeting the expense of this Association should come from the local societies herein represented.

There was no action taken upon the suggestion.

On motion of Dr. ALLPORT, —

Resolved, That the thanks of the Association be tendered to Mr. Crosby, for a contribution of twenty dollars to the Treasury.

Upon being called, Dr. JOHN ALLEN read the report on Mechanical Dentistry, which was referred to the Publication Committee.

Dr. BUCKINGHAM presented and read a paper on Hard Rubber, by Dr. Wildman. He exhibited an extended series of preparations, by Dr. Wildman, showing the results of a great variety of compositions.

The Committee on Dental Education was called upon, when Dr. L. D. SHEPARD read the report which had been prepared by Dr. Taylor, Chairman of the Committee.

The Committee on Dental Literature had no report.

On motion of Dr. W. P. HORTON, —

Resolved, That all Dental Societies and Colleges entitled to representation in this body be requested to send in their annual reports, embracing such subject-matter as they may judge to be of interest; and that, hereafter, time be allotted for the presentation of such report.

Reports were presented and read from several societies, when on motion it was, —

Resolved, That all similar reports that may be here for presentation be passed to the Publication Committee, there not being time for their reading.

Dr. GEO. B. SNOW exhibited and explained a compound blowpipe.

Dr. MCQUILLEN asked leave to withdraw from the Committee on Dental Literature, assuming that no member should be on more than one committee at the same time. The request was granted. Dr. A. Hill was appointed Chairman, and Dr. F. Y. Clark to fill the vacancy.

Dr. DANFORTH exhibited a pair of adjustable forceps, also a press for preparing corundum wheels.

Dr. ATKINSON made some remarks upon the use of chromic acid for obtunding sensitive dentine. It operates rapidly and efficiently; it should be used with great care. He remarked that it was first suggested to him by his assistant, Dr. T. Rowe.

Dr. M. W. SHERWOOD gave a formula of a preparation for devitalizing dental pulp. It consists of three parts each of narcotine and tannin, and one of arsenic.

Dr. KENNICOTT opposed the use of arsenic in any form for destroying dental pulps.

Dr. A. HILL described the proper manner of using Hill's stopping.

On motion of Dr. ATKINSON,—

Resolved, That the Constitution and Transactions of this Association, from its inception to the close of the present session, be referred to the Committee on Publication, with a request to thoroughly revise and proof-read the same; also —

Resolved, That the said Constitution and Transactions, bound in one volume, be presented to each member of the Association who has paid his dues and assessments, including the present year.

The Association adjourned till 8.30 o'clock, P. M.

FOURTH DAY. — Evening Session.

The Association met according to adjournment. President in the chair.

Minutes of the afternoon session were read and approved.

On motion of Dr. WETHERBEE, a vote of thanks was tendered to the Committee of Arrangements for their attention to the duties of their position, and to the entertainment to the members of the Association.

On motion of Dr. HILL, —

Resolved, That the thanks of the Association be tendered to the reporters of the press, who have reported so accurately and efficiently the proceedings and discussions of this body.

Dr. SALMON, of Boston, asked to be excused from serving on the Committee of Arrangements. His request was granted, and Dr. B. S. Codman appointed in his place.

Dr. GLENN exhibited a kerosene burner and apparatus for vulcanizing. The method of using it was clearly explained.

Dr. MCQUILLEN presented and read a paper from Col. John Lewis, D.D.S., of the Invalid Corps, upon the subject of exemptions from military service on account of loss of teeth, which was referred to the Publication Committee.

Dr. Buckingham exhibited beautiful experiments with potassium, sodium and magnesium.

On motion of Dr. Buckingham, —

Resolved, That the Committee on Dental Literature be requested to pass their report to the Publication Committee, when it shall be finished.

Dr. FORBES presented a case which was sent to the Association for advice, by the St. Louis Dental Society.

The following gentlemen were appointed a Committee of Examination, viz, Drs. Atkinson, Taft, Buckingham, McQuillen, and Hildreth.

The patient, a girl of about fifteen, was from the St. Louis Hospital, where she had the best medical treatment. The bones of the palate and nose, with much of the soft tissues and cartilages, were destroyed; the destruction still going on, though with less rapidity than formerly. The disease commenced, at five years of age, by ulceration of the throat. The disease had not manifested itself in any other parts than those mentioned, and no predisposing causes, either hereditary or otherwise, could be discovered.

The case was left in the hands of the Committee for further investigation.

On motion, the Association adjourned to meet in the city of Boston, at 10 o'clock, A.M., on the last Tuesday of July, 1866.

J. TAFT, *Secretary.*

ADDRESSES.

REPORTS OF COMMITTEES, AND PAPERS.

ADDRESS OF WELCOME,

BY

W. W. ALLPORT, DD.S.

MR. PRESIDENT,

And Gentlemen of the American Dental Association:

In bidding you welcome to the city of Chicago, on an occasion so interesting and auspicious to our Profession as the present, it may not be deemed inappropriate to the time and place of our meeting, to indulge in a brief retrospect of the past.

In the summer of 1859, twenty members of the Dental Profession met in convention at Niagara Falls, to consult together as to the expediency of forming a National Association upon the representative basis. All, I believe, who were present felt that if such an association could be formed, and should receive the sanction and co-operation of any considerable portion of the better class of practitioners, the best interests of the Profession would be promoted, and great good result to the public.

The number of State or local societies, then existing, to send delegates to the annual meetings of an association of this kind, was so very limited, that but few even of the small number present felt at all sanguine of the ultimate success of such an enterprise. But in view of the many great and good results anticipated from such association, in case it should be crowned with success, and in the hope that the formation of local societies would be stimu-

lated thereby, it was determined to take the initiatory steps for the organization, deferring final action until the following year.

At the appointed time, July 31, 1860, twenty-three delegates only, of the various Dental societies and colleges then existing, met in the city of Washington, and the American Dental Association was organized, and entered upon its work. Five years only have passed, and from what was a small and doubtful beginning, by the steady and well-directed efforts of those who were instrumental in its formation, this Association has become one of the most successful enterprises of the Profession, and one of the most useful and influential Dental societies in the world.

Of the professional standing of those who have attended, as delegates, the annual meetings of this Association, and have been accustomed to take part in its proceedings, it is not necessary for me to speak. They are universally acknowledged as standing among the most scientific and successful operators of our time and country, and as belonging to the class progressive. The Essays and Discussions of the members of this Society have passed into the literature of our Profession and become a part of its history. In point of ability they have been by far the ablest and most instructive that have ever emanated from any body of dentists in our country, and will suffer little, if any, in comparison with the essays and discussions of the American Medical Association. Should this Association adjourn sine die to-day, and never hold another meeting, yet sufficient good has already been accomplished by it to fully vindicate the wisdom and foresight of those who first projected it, and have done the most to sustain it.

As we cast our mind's eye over the history of Dentistry, and see how, in the last forty years, it has risen from a tinkering, catch-penny calling to the dignity of a noble profession, in whose ranks may be found men of high moral and scientific culture, commanding alike the confidence and respect of the educated and refined, we can but attribute much of this progress

and pleasing result to the influence of our various local and national associations. All of these associations have their influence for good, and are important, but none is so well calculated, in every respect, to allay that spirit of jealousy and distrust in each other — that fatal millstone around the neck of all selfish communities — none so well calculated to strengthen the bond of a common interest and brotherhood, that should bind the Profession of the East with the West, the North with that of the South, and make all to feel their mutual dependence upon each other, as a representative National Association. In it are embodied the principles that underlie the structure of our national government, which has demonstrated to the world, that for the protection of a community of interests, or for the development of resources, whether material or mental, no organization or government is so strong as that based upon the principles of a representative Republic.

You are all familiar with the advantages of association and combined labor in the various avocations of life, no matter whether it be in mental or physical labors. You assemble here to-day, as delegates and members from different parts of our extended land, and in the discussions here elicited you will find new illustrations of the old familiar truths, that "knowledge is power," "union is strength," and "in a multitude of counsellors there is wisdom." By the contact of mind with mind both will be strengthened, and embryo ideas and theories will be developed into full maturity. "There is a magnetism in such contact, full of creative energy. Flint and steel are passive in themselves, but clash them together and they give out fire, and brightness dazzles upon the sight. The positive and negative poles of a battery never come together without a result. By friction of different mental organizations together, an idea is evolved, a new law is discovered, a new creation is added to the wealth of knowledge, and the long-coming rays of a new truth, like those of a far-off star in the laboratory of heaven, reach and illumine the world."

Gentlemen, this Society was organized for a purpose. Its mission is not yet fulfilled. It has a great work to do — a destiny to accomplish. The men who were instrumental in its formation were not discouraged because it was so small and unpromising at first. They knew that in the Profession it had a strong and vigorous mother to nurse it, and that its growth was certain, but they did not expect it to mature so rapidly. Nor will those who are now engaged in it be so elated by its unexpected success as to allow it to sink under that supine and careless indifference, which so often follows prosperity. Its course will be onward and upward — its motto, Union and Progress.

As the scourge of war passes away from our country, and peace "with healing in her wings returns to bind up a nation's wounds," and those who have hitherto stood arrayed against each other in deadly conflict shall engage in the various pursuits of industrial activity; as that portion of our country which has been laid waste by the desolating hand of war shall be rebuilt, and the millions, North and South, in trust and harmony, shall once more labor to develop the untold treasure of our broad domain, we may look forward to a period of unexampled prosperity in the history of our country.

The rich cotton plantations and rice fields of the South, with the broad prairies and fertile valleys of the North, shall yield an abundant reward to the freemen's hand; the slave-pen and human auction-block shall give place to the church and the school-house; with human slavery, the source of all our troubles, forever extinguished from our land, honest pay shall be awarded for honest toil, and we may look for a season of prosperity such as the country has never known.

Wealth, education and refinement will become more general; and our profession will be called upon to administer to the wants of a higher civilization. To ameliorate suffering and contribute to these wants should be our aim.

To be the better prepared to do this, we should divest our-

selves of all selfishness and vanity of opinion; and with uncovered heads drink of the fountain of knowledge, from whatever source it may flow. We should measure ourselves with ourselves, not to show that one man is stronger than his fellow, or to pull down those who have been more successful than ourselves, but to give just confidence to the timid, and to strengthen and raise up the weak. None should be ashamed to learn, or afraid to teach. Freely to give and freely to receive should be our object.

Some of you, before reaching home, will have travelled thousands of miles to attend this meeting. It may be you have come burdened with the rich treasures of experience and skill, to lay them upon the common altar of your Profession, for other's good; or, it may be you have come to drink from the fountain of thought which others have prepared for you. Here, as ever, he who would freely receive should freely give. And here, too, the "widow's mite" is as acceptable as the rich man's treasure. Whether you have come to give or to receive, gentlemen, as Chairman of the Committee of Arrangements of the American Dental Association, I bid you welcome to the Garden City of the Lakes — to the Commercial Metropolis of the Northwest.

Many of you visit to-day, perhaps for the first time, the city of Chicago. As you walk our streets, and see our magnificent and well-filled stores, our palatial residences, our splendid churches, our model schools and colleges, our grain elevators and warehouses — the largest in the world — our shipping, our railroads, branching out in every direction, our magnificent Chamber of Commerce with its massive and solid proportions, and this artistic and imposing opera building in which we meet; as you look around and see here the largest grain depot on the continent, a city stretching out for miles in every direction, with a population of two hundred thousand souls, it may not be amiss for me to state that it is not yet thirty years since Chicago was known only as a military post

with a few Indian traders, who were supplied with the comforts of life from the East.

The very spot on which we are assembled to-day, in this splendid temple devoted to the fine arts, in the centre of this great commercial emporium, thirty years ago was but a hunting-ground covered with prairie grass, through which the Indian pursued his game.

And yet last year our city sent forward to the sea-coast and to European markets nearly fifty million bushels of grain, enough, if placed in freight cars, to make a train extending almost to the city of Philadelphia. The growth of only a quarter of a century has made Chicago the largest original grain market in the world, not excepting Odessa, the famous grain market on the Black Sea.

From whence comes this prosperity — this rapid growth? It may be all told in one word, and in it is taught us an important lesson — *Enterprise.*

To Chicago, then, as the metropolis of Illinois, and to Illinois, the leading State of the great Northwest, I again bid you welcome. The soil on which you stand to-day is too new to boast of ancient or classic memories, yet it is rich in the most sacred and patriotic associations. It is the home of statesmen, heroes and patriots, that have stood forth nobly in defence of the institutions founded by our fathers, and whose fame has gone forth over the whole world.

In the suburbs of the city, on the shore of Lake Michigan, you will stand by the grave of the gifted and patriotic Douglas, whose eloquence once thrilled our halls of legislation, and who, dying just as the greatest rebellion the world has ever known, was bursting upon the nation, left as an inheritance to his children, and to his countrymen a legacy, which so long as time shall last, shall stand out brightly on the page of history, the immortal words, "Obey the laws and support the constitution of your country."

And here, too, in his quiet Illinois home, engaged in the duties of civil life, was found the great soldier and military leader, whose genius and heroism, after carrying the armies of the Republic through the bloody battles and victories of Donelson, Shiloh, Vicksburg, Chattanooga, Spottsylvania and Richmond, at last won for us an honorable and lasting peace, and made the name of Grant immortal as is the history of his country, and of whom it may be said, as of one of England's great leaders, "he never fought a battle that he did not win, and never encamped before a city that he did not take."

And finally, in this city, five years ago last month, in a building erected for the purpose, and which is still standing, was placed in nomination for the Presidency, Illinois' honest and cherished son, whose sagacity and statesmanship guided our country safely through the perils of a gigantic rebellion, and whose untimely death left a nation in tears. Millions yet unborn will tread these streets, as they wend their way over the Western prairies, on their pilgrimage to the grave of liberty's noblest martyr, ABRAHAM LINCOLN.

Again, gentlemen, I bid you welcome. Welcome to your duties — welcome to your pleasures — welcome to Chicago.

ADDRESS OF WELCOME.

DR. T. P. ABELL.

Gentlemen of the American Dental Association:

For a young man, just at this moment I feel myself immensely and intensely embarrassed, and I do not know that I can better commence my remarks, or put myself in a frame of mind to commence them, than by telling a simple story. Very many years ago when Gen. Lafayette was about to visit this country and look again upon the scenes of his struggles and triumphs in the cause of American freedom, the Hon. Daniel Webster was selected by the authorities of Boston, to make the oration on the occasion of the reception. It happened that just previously to the arrival of the distinguished individual, — the nation's pet, as he was called, — Mr. Webster went out one day, to enjoy his favorite amusement of cod-fishing, and cogitate upon the speech which he proposed to make. Having finally caught a nibble, he pulled in the slack, and on drawing aboard a splendid specimen of the cod tribe, he said aloud, "illustrious representative of two hemispheres, we welcome you to these shores." It is related further, I believe, that his fish-ship, entirely overcome with the unaccustomed eloquence, sat down on his side and seemed contented.

Gentlemen, we cannot exactly regard you as being the representatives of two hemispheres, but we do consider that you are altogether worthy of two receptions. And this, I believe, is in perfect accordance with the spirit and character of our city, which would much rather duplicate much rather overdo than

underdo, her civilities to her visitors. I particularly sympathize at this moment, with that kind, ancient lady, on whom a venerable clergyman called, one fine morning, to enjoy with her a quiet cup of coffee, whether from choice or straightened circumstances I know not, but it chanced that she sweetened it with molasses; after putting in spoonful after spoonful, the gentleman ventured to intimate that it was sweet enough. "La me!" she said, "It would not be too good for you if it were all 'lasses." I have a private suspicion, by the way, that the old gentleman did not see the 'lasses in that light.

If we should happen to be too sweet on this occasion, we trust you will excuse it, on account of good intentions. The very cheerful greeting of the gentleman who preceded me, would, I venture to say, assure you that the members of the Western Dental Societies are second to none others in their heartiness of purpose, and the pleasure with which they greet you.

I look before me, and I see no aged men, but I see men who are leaders in our common cause; — men whose talents, whose accomplishments, whose reputations, would make them ornaments to any cause, to any profession. And it does not seem to me that any dentist, — that any one who has the slightest appreciation of his calling, can consider occasions like these as destitute of the highest and most beneficent ministrations. It must be evident to the most casual observer that opportunities of professional intercourse and fellowship and friendship, like these, must necessarily largely tend to the improvement of the state of social and fraternal feeling among us; and, God knows, there has been occasion for this. Formerly we were too much as the members of the scattered tribe of Ishmael (if Ishmael had a tribe), our hands turned against those of others, and others against our hands. Being dentists, it seemed that our interests were diverse, our success antagonistic, our reputations liable to be overshadowed by our neighbor's. Association must necessarily tend to the doing away with these impressions;

show us the folly and sinfulness of our earlier and selfish course; must eliminate the great fact that the advantage of one is necessarily the gain of another, — the great fact that no man liveth for himself, no man dieth for himself alone. There is, gentlemen, the great law of the generalization of good, resulting from harmony of feeling and action, counter to which it is unwise for any man to go, and which cannot be better enforced and sent home to the heart than by the meeting together of different parties on the common basis of equality and fraternity.

Then, sir, these associations are travelling schools of instruction and peripatetic dental colleges, wandering centres of wisdom, where those who wish to teach and those who wish to be taught, can unite and become all the wiser and the more useful. It is impossible to estimate the good that has already been accomplished through this and similar instrumentalities. It is impossible to foresee the amount of good which shall yet spring from them. But from what we have seen, we may expect proportionally more in the future. No man can attend a single session of this or any similar body, and go away without an addition to his stock of information, or without receiving a new stimulus to his ambition to prompt him to do all the better in the future; and it is precisely such opportunities as these which are the saving opportunities, without which any dentist is well-nigh lost. I think I hazard nothing in saying that the standard of general dental practice has been improved at least fifty per cent since the organization of this society; this is but one of the thousand advantages which have sprung from the persevering endeavors and co-operation of a few individuals; and I say, were the work to stop here, all glory to those men!

And then, sir, not to detain you too long, there is the elevated position which we now occupy in the eye of the world's observation. Straggling vagabonds and loafers there still are, who steal into the nethermost corners of our profession, but

who, at our present rate of progress, will soon be shaken off, or elevated to a more worthy level. It is but a few years since, that dentists were spoken of in the medical journals as being too illiterate to mingle with the profession. To-day, there is not a medical journal in the land that would hazard the use of such an expression. From our pursuit of studies which physicians know to be indispensable — from our availment of resources which are not at their command — they have surrendered to us a specialty which was once their own. They began to approach us; while, on the other hand, the people, seeing our increased respect for one another, and finding we have no particular designs or intentions upon the teeth of themselves, accord to us a greater degree of confidence than we have before received. These are encouraging omens, and they may well enough stimulate our hearts in behalf of a profession which is competent to contribute so largely to the health, beauty and happiness of mankind.

I fear that I speak too much, and bore you too deeply. What I designed to say chiefly was this: that, from the innermost depths of our heart, we render our earnest greeting and cordial welcome, and only entreat, in return, that you continue to lend us the light of your wisdom, to guide us on to a still better and brighter day.

RESPONSE OF THE PRESIDENT,

DR. J. H. McQUILLEN.

GENTLEMEN:

On the part of the Association I thank you for your kind words of welcome. To the delegates assembled it is my duty to direct attention to the fact that each one has come to this meeting as a representative of some society or institution, and it is important that every one should regard it as a duty to present the views of his section upon the various topics which will come up for discussion. Differences of opinion must be expected among independent minds, and their free expression, in place of retarding, is rather calculated to advance the interests of science; this, however, is not to be accomplished by a dogmatical presentation of views on the part of any one, but by a clear and argumentative mode of reasoning, aiming to convince rather than to overawe. Most of us have come many hundreds of miles away from home; let each and all, therefore, turn out the silver lining of our manhood, that everything may be bright and cheerful, and nothing occur to disturb the harmony, or interfere with the usefulness of the meeting. Let no personal misunderstandings or local difficulties, if there are such, be apparent here. In addition to the objects which the Association has in view, it should be remembered that every organization based like it, on the representative system, whether established for the advancement of science, of religion, or the general good of humanity in other directions are so many links in the chain calculated to reunite and bind together in the strongest manner possible every section of our beloved country. If for no other reason than this the cultivation of harmony is desirable.

ADDRESS OF THE PRESIDENT,

C. W. SPALDING, D.D.S.

Gentlemen of the American Dental Association:

For the honor which it has been your pleasure to confer upon me to-day, I return you my most sincere thanks. This, gentlemen, is no mere formal expression of gratitude. I am not insensible to the importance of the distinguished position to which you have called me, and I cannot but feel that in calling upon me to preside over the deliberations of this body, you have given such an expression of your confidence, as no man should fail to value, coming, as it does, from this body, the highest known in the profession, — in the world, — and which contains within its ranks the intelligence and skill of the Dental Profession of this country.

Gentlemen, in the discharge of the duties which are incumbent upon me, I shall endeavor to exercise impartiality, and shall perform the duties according to the best of my knowledge and ability. I hope, I trust, indeed I know, that I shall be fully sustained in that labor by every member here present.

Again allow me to thank you for the honor you have conferred upon me; and, as I do not intend to make any extended remarks on this occasion, I now give way, that you may listen to an address from our late President, Professor McQuillen, of Philadelphia.

ADDRESS

ON RETIRING FROM THE CHAIR,

BY

J. H. McQUILLEN, M.D., D.D.S.

GENTLEMEN, — Esteeming it a greater privilege to be a worker in an association such as this, than to hold any other position which a member can occupy; it is a pleasure to find myself again at liberty to take an active part in the deliberations; at the same time, I am not insensible to the kind regard which actuated you in placing me in the position from which I have retired, or the forbearance with which my deficiencies were overlooked during my term of office.

Having been appointed at the last annual meeting "To prepare and present at its next session a full history of the AMERICAN DENTAL ASSOCIATION from its incipiency," I have concluded to embody this in my retiring address. Prior to presenting the history, it is advisable, however, to take a brief retrospective glance at the efforts which had been made to establish a national society before this organization came into existence. The first step toward such a society was made about twenty-five years ago, when Drs. Hayden, Harris, and other prominent practitioners met together and established the "AMERICAN SOCIETY OF DENTAL SURGEONS." The basis of that association provided that there should be acting and honorary memberships, the candidates for the first class submitting to an examination on the part of a committee appointed for that purpose. For a

number of years, considerable interest was manifested in its transactions by the members, and the prospect of future usefulness was bright and encouraging. Eventually, however, the unwarrantable authority was assumed of dictating to members the modes of practice they should pursue; internal dissension was the result; a number of members were expelled; others lost their interest in the meetings; and the society diminished in numbers until, at the fifteenth annual meeting, only nine members were present. This limited attendance convinced those present that every prospect of usefulness was gone, and the President, Dr. Townsend, in an address, advised that it should give place to a less exclusive organization. Resolutions were drawn up in accordance with this suggestion, and the dissolution of the society distinctly proposed; these were acted upon at a subsequent annual meeting; and thus after a brief existence, a society which had given the first impulse to associated effort among dentists was brought to a close. The antagonistic spirit which occasionally characterized its proceedings has been regarded by many as the cause that led to this. But the correct explanation may be found in the fact that while losing some members, and the sympathy of many others, the society made little or no effort to secure the young talent and energies of the profession, and failing to receive fresh additions to its ranks it ceased to grow, and in accordance with an immutable law of nature, repair not being equal to waste, death ensued.

Succeeding this, the AMERICAN DENTAL CONVENTION was formed, so lax in its requirements that it admitted all applicants without respect to qualification; the educated dentist, and the man who had not been a month in a dental office, were on an equality there. This movement, however, was received with favor by the profession; and at the first two meetings in Philadelphia and New York, all went on smoothly and prosperously. After the next annual meeting, exceptions began to be taken to the Transactions as reflecting little

credit upon the profession; and from 1857 to 1859, many articles appeared in the dental journals upon the subject. Fully recognizing the force of all the objections urged, as they were in accordance with my own convictions, and desiring to see an organization established which would develop the talent and energies of the profession in every part of the Union, I prepared a paper which was published in the DENTAL NEWS LETTER, April 1859, over the signature of JUNIUS, as follows:

BASIS OF A NATIONAL DENTAL ASSOCIATION.

During the past two years, no subject that has engaged the attention of contributors to the dental journals, has been a more prolific theme of animadversion than the proceedings of the Dental Convention. Though some of the communications have been characterized by a spirit of vituperation that was uncalled for, others, couched in language of refinement, have shown that the later sessions of the organization have failed to meet the demands of the profession for a more accurate science, and a more perfect art. So universal, indeed, is this feeling, that many who gave it a hearty support in the beginning, have of late held entirely aloof from it; and now it is asserted that many of its best members, who have supported it to the last, and whose praiseworthy efforts and services have been the redeeming features of the Association, have determined to abandon it. How deep or extended the sentiment may be with these gentlemen, it is impossible to say, but the assertion is made upon unquestionable authority.

This spirit is in keeping with the whole tendency of our time for innovation, revision, and, where possible, reconstruction, according to an advanced idea. Never at any period was the iconoclastic spirit more rampant than now. The land is strewn with the wrecks of broken idols. Doctrines, respectable from the very grayness of their antiquity, are rudely hauled up to

the bar of popular judgment, and as summarily despatched. Social and political dogmas that have stood undisturbed for centuries, recognized of all men as true and real, vanish into thin air before the sharp scrutiny of modern inquiry.

Among the many consequences of this peculiar intellectual activity of the age, we have, doubtless, many absurdities, much denial of what is really true and excellent, much idle questioning of the palpable and ten times proven, much painful assault upon the essentially good and venerable. These, however, are but its abuses and extravagances. It is doing, notwithstanding all this, a priceless work for the world. The errors it has destroyed, the facts it has accumulated, the discoveries it has made, and the principles it has evolved, are of immense account in the aggregate. In addition to this, it has disseminated a more free, discursive, and profound spirit of philosophical inquiry, and the idea of a continuous scientific progress and an ever-perfecting artistic development, as yet without apparent limit, although necessarily finite, has become almost universal, and permits no pause in our onward career. All the mighty things that have been done are regarded as but the earnest of what man can and soon will do. The Utopian dream of yesterday is the accomplished fact of to-day.

If that which originated in the early periods of the world's history, and had become time-honored and venerable on account of its antiquity, is thus summarily dealt with, why should there be a hesitancy in revising or reconstructing an organization that is said to have become impotent, though but recently established. It was intended, indeed, only to subserve the exigencies of the period, and to prepare the way for a more permanent and useful association. Its very name — Convention — implies the ephemeral, not the persistent. The absence of a constitution, laws, or qualifications for membership, partakes of the transient, not the established.

That there was an absolute demand for such an organization at

the time of its formation, few who are familiar with the history of the profession will deny. And it must also be acknowledged that it has been instrumental in accomplishing a great work, by bringing practitioners from different parts of our wide-spread country in contact with each other, thus affording opportunities for an interchange of views, in theory and practice, and the establishment of pleasant relations between members far removed from one another by their respective fields of labor; but the most important service rendered, is the impetus it has given to the formation of numerous local societies. Its day of usefulness, however, is apparently passed; its absurdities censured with just cause; losing the support of some of its best men, its end seems near at hand.

In such an event the question naturally arises, What shall be the basis and character of the substitute?

On this point the following views are offered suggestively, only desiring, if they are inoperative, that a better and more practicable method may be proposed.

Every member of the profession, fully impressed with the dignity and importance of his calling, must deplore the inferior qualifications of many who have been long engaged in practice, and of numbers of those who annually enter the ranks of the profession. In his individual capacity, or through the medium of local societies, he can accomplish little towards a general reform; and it is only to a body representing all the various interests of the entire profession of the country, that he can look to as the proper medium through which to effect so desirable a change.

To give it stability and character, and deprive it of any approach to a clique, the proper basis of such an organization should be a representative body, composed of delegates that have received their appointments from permanently organized Dental Societies, and regularly constituted Dental Colleges; each society possessing the advantage of sending to the associa-

tion one delegate for every five of its regular members, and the faculty of each college enjoying the right of being represented by one delegate.

Consisting of delegates, representing on a liberal scale every interest of the profession (the Dental Societies, State, county, and local, and the Dental Colleges), it would exercise an influence and wield a power possessing all the force and energy of a government. Deriving its just powers from the consent of the governed, it would rest its claim of authority on the equitable principle that in representative bodies the majority must rule.

It may be urged as an objection to a representative basis, that the number of organizations are not sufficient to form a body of delegates of any size; but this drawback would decrease each year, on account of the stimulus such an association would give to the development of local societies; and, in addition to the delegates, there could be members by invitation and permanent members. The first to consist of practitioners, of reputable standing, from sections of the United States not otherwise represented at the meeting. These, receiving their appointments by invitation of the meeting, after an introduction from any of the members present, should be entitled to participate in all its affairs, as in the case of delegates. The second, or permanent members, to consist of all those who have served in the capacity of delegates, and of members that have received their appointment by invitation.

Such is the basis of the American Medical Association, which has operated with the happiest results for years. Such (the representative) is the basis of all popular government, and of our great national union. Why can it not be the basis of an American Dental Association? JUNIUS.

A short time after this appeal was published I drew up the following memorial, and having secured a number of signatures

in Philadelphia, sent duplicates of it to the local societies then in existence. It read as follows:

"The undersigned, practitioners of dentistry, believing that a National Association of Dentists, composed of delegates from State, county, and local societies and dental colleges, would be calculated to promote the best interests of the profession, respectfully suggest to the dental societies and colleges throughout the country, the propriety of electing delegates to meet in convention at the Falls of Niagara, on the first Wednesday of August, 1859, for the purpose of forming, if the assembled delegates shall deem it expedient, a National Association upon a representative basis."

The local societies responded promptly, and the signatures of some forty dental practitioners of Pennsylvania, Ohio, Michigan, and Illinois were appended to this. And subsequently delegates were elected by each society and college in accordance with it.

Notwithstanding the hearty endorsement thus secured, the paper over the signature of Junius, and the memorial, awakened such misapprehension, misrepresentation, and opposition in some quarters, that it seemed more expedient to start a new association than attempt to reform the old one. With this understanding the delegates met in convention at Niagara at the appointed time, twenty-five members being present, and a committee was appointed to draft a plan of organization, which was promptly presented. To prove however that there was no disposition on the part of those engaged in the enterprise to move hastily, but on the contrary a desire to secure the harmonious coöperation of all the liberally educated members of the profession it was unanimously resolved to defer acting upon this report until the next year, when, at Washington, by the adoption, with unimportant modifications, of the original plan as the constitution of the body, the AMERICAN DENTAL ASSOCIATION was established, twenty-three members being present at the organization. When

the time arrived for the next meeting, at Cleveland, the war had burst in fury over the land, and the annual meeting was postponed.

The Association assembled, however, in that city in the following year with only fourteen members present. At the next session, in Philadelphia, fifty-six members were present.

At Niagara, last year, eighty-eight members were in attendance, and now, in Chicago, we number one hundred and twenty-four.

Another important fact should not be lost sight of, at the first meeting of the delegates there were only ten local societies and institutions in existence, whilst at this meeting delegates are present from thirty-four organizations, and several more in existence elected representatives who were unable to attend. Formed, as these additional local societies have been, since the organization of this Association, they may be properly regarded as offsprings of this as a parent society.

Thus this Association, conceived at a period apparently the most inauspicious, born when the spirits of evil were concocting the hell-broth of rebellion, rocked in the cradle of adversity, has gained fair proportions, exercised a powerful influence in the profession, by stimulating individual and associated effort; and it is reasonable to infer that an organization which can survive such an ordeal; in a time of peace and prosperity, when those with whom we have been contending on the bloody field of battle shall only contend with us in the peaceful pursuits of life, and when in this great country of ours, no sectional distinctions of north, south, east or west shall continue to foster bitter and deadly antagonisms, but on the contrary a generous spirit of rivalry only shall exist, we may look for a larger increase of members and a more extended sphere of usefulness.

We have met with a certain measure of success, and should not be unduly elated by it, but rather let it be an incentive to renewed effort, and so act and live that we may leave an exam-

ple worthy of imitation for those who follow us. We should encourage and favor the young men, for they are the life-blood of societies, and it is to them we must look for the future progress and development of our profession. It would be folly to regard this organization as perfect; it answers present contingencies, but the wants of the future may demand modifications; let those be met in a truly catholic spirit. There are some who objected to changes, but what gives an appearance of life and freshness to the world but the constant changes in the face of nature in spring, summer, autumn and winter? The death of the old is ever the birth of the new. That which is true of nature is also true of societies. In a constant but harmonious change of elements there is vitality, utility and progress. Above all things we should avoid cliques, for nothing tends more to mar the harmony, impair the usefulness, or hasten the dissolution of an association than by tolerating such combinations. Permit nothing of the kind, and cherish a true spirit of liberality. Finally, in the words of that noble man and blessed martyr, Abraham Lincoln, "with malice toward none, with charity for all, with a firmness in the right, as God gives us to see the right, let us strive on to finish the work we are in."

REPORT

OF THE

COMMITTEE ON DENTAL PHYSIOLOGY,

By C. P. FITCH, M.D., Chairman.

Mr. President and Gentlemen:

Dental Physiology, in its broadest and most extended signification, relates as much to those forces and functions which dominate structure and preside over the formative and disintegrative processes as to the specific functions of the teeth after eruption. This view renders important an intimate acquaintance with their several stages of development, their elementary constituents, and ultimate structure, as well as a knowledge of the direct and legitimate purposes they subserve in the animal economy.

All Physiologists meet with insurmountable obstacles the very moment they attempt to carry their investigations into the domain of living tissues, and essay to mark with minute accuracy the ceaseless change which characterizes the entire roll of integration and disintegration.

It is an interesting field for physiological research, and especially interesting to the dental student, to understand every slight physiological act and observe every consequent histological condition, from the first appearance of the tooth-germ to its full and complete development. But this has not been the privilege of any one individual. Sufficient observation, however, has been made to determine the general conditions and the changes which occur during the germination and growth of these organs.

A very important inquiry connected with this subject is the question, in what sense, and how far, does the mother contribute, during gestation, to normal or abnormal dental structure? and, in this respect, how far may abnormal results be prevented or removed? As maternity is the source and continuance of the nutritive pabulum during uterine gestation, and usually is, or at least should be, during the first months of infantile life, the question arises, may and does not the mental and physical conditions of the mother affect detrimentally the fœtal and infantile aliment, both in regard to its quantity and quality.

If this question has its foundation in physiological truth, can we expect healthy, robust dentures; and much less, need we look for the conservation of such dentures, even under the auspices of the ripest erudition and the most consummate skill? Do not such indications call most imperatively upon the dental practitioner, as a mere conservator of these organs, to administer promptly the remedy, both hygienic and curative to that point whence originates the structural lesion? Has not the time already dawned upon us, yea, do not the demands of this subject urgently press upon us, as members of a far-reaching and widely-extending profession, the importance of furnishing to mothers the instruction requisite to the full comprehension of this entire subject?

The imperative necessity of supplying themselves during this hyper-physiological period, with sufficient and appropriate nourishment to insure healthy fœtal nutrition, should be faithfully urged upon their attention.

It should also be brought to their notice the great importance of maintaining that equilibrium of nervous condition which contributes in a very important sense to healthy structure; or, in other words, determines to a great degree the physical character of the structure in process of formation. It is my deliberate conviction, gentlemen, that early and rapid decomposition of teeth is rather due to defective organization than to any or all

other causes combined; and when such teeth are connected with a vitiated constitution, their early destruction is, as a general thing, a foregone conclusion. Neither need we expect to see in our day the highest results attainable in regard to strong, healthy and beautiful dentures, without thorough and appropriate culture in this department of physiological dentistry.

It should ever be borne in mind that the nutriment which ministers to fœtal life is borne thither through the arterial currents of the mother; and a defective organization will be produced just in the ratio of a deficiency of those appropriate vegetable and mineral elements which enter into and contribute directly to the formation of fœtal structure.

A generous diet, therefore, should be recommended during gestation. Care, however, should be taken that, the inorganic elements be not too heroically administered, lest we defeat the ends of successful labor, and compromise the life of either mother or child, or both, by producing an hyper-ossific fœtal development.

Whilst monstrosity of growth should be guarded against on the one hand; pigmies in form, and defects in structure should be equally provided for on the other. It should be well understood that normal dental nutrition may be, and often is, perverted or seriously interfered with in the fœtus and infant (but more especially in the former), by intensified nervous conditions of the mother.

When it is remembered that every tooth-germ has incorporated into its very essence, a force denominated the germinal or typal force; and that this force dominates or determines the character of the several structures composing the tooth; and the proper manifestation of this force, depends upon certain physical conditions and mental states, viz: temperature, electricity, appropriate pabulum, its assimilation and effete elimination, protracted and undue excitement of the nervous force, anger, grief, anxiety, remorse, intense thought, strong emotion, &c. I say when this is remembered it will readily be seen how

the essential character of a tooth is intimately allied with the maternal (physical and mental) conditions; also how much importance should be attached to these considerations when investigating and removing the causes of defective dental structure, or of dental caries.

To what extent organic dental lesions may be removed by subsequent treatment is a question not yet fully settled.

That calcification of enamel and dentine, but more particularly the former, or the infiltration of lime salts, may be, to some extent, effected for some years after the eruption of the teeth, by the proper exhibition of these agents in appropriate washes, designed to cleanse these organs, has been fully demonstrated.

This feature of the subject, gentlemen, I would call particular attention to, as one eminently practical, and fraught with vast consequences to the younger members of our practice.

A minute and comprehensive histological survey of the dental tissues, at the present time, by your Committee, might be considered a work of supererogation. In such an attempt, nothing more could be presented than a review of the observations and results of those who have labored long and arduously to explore this field, and open to view its complex and beautiful structural arrangements. To all such of our profession as are interested in this direction of scientific inquiry (and all should be), an examination of the writings of Magitot and Robin, John Tomes, F. R. S., Lionel S. Beal, and others, will amply compensate for the expenditure of any time and thought they may think proper to make in this direction.

At a trifling expense, however, compared with accruing benefits, the most humble member of our profession, by the aid of the microscope, may explore for himself this entire department of histology and physiology, so rich in organic matter, so varied and beautiful in structural arrangement, and so replete with instruction and interest.

Knowledge thus derived is much more satisfactory than that

coming to us through the labor of others, however elaborately such results may have been recorded upon the printed page.

We will notice briefly, however, a few of the more prominent characteristics connected with this branch of dental science.

A tooth is quadruple in its nature — Enamel, Cementum, Dentine, Pulp, each having a peculiar arrangement of its elements which distinguishes it from the other.

The Enamel is composed of hexagonal cells, superimposed upon each other in linear order, constituting enamel fibre, which, uniting at their sides, form the intertubular substance. The enamel constitutes the covering of the crown of each tooth, and terminates at its neck. It is elaborated from the enamel pulp, which is the first substance met with as the capsule proper of the tooth is laid open. From this enamel pulp, which is composed of enamel columns filled with a few nuclei and germinal matter, the enamel fibre is produced, calcification commencing in the periphery of the fibres at a point of junction between the enamel columns and enamel fibre.

This point is called the membrana preformativa of Huxley, and the persistent membrane of Nasmyth. Other physiologists deny that there exists any membrane whatever between the enamel columns and enamel fibres. The existence of this membrane is only demonstrated by the use of chemical re-agents; and, it is claimed by Mr. Tomes, "that a tissue, the existence of which can be demonstrated only by changing the chemical composition of the part, must be looked upon with doubt." At the time of the eruption of a tooth, the enamel fibres are but partially calcified. Hence the soft, friable nature of the enamel at this period, and its hardening by subsequent calcification.

The Cementum constitutes that substance which covers the root. It commences at the neck of the tooth, and, increasing in thickness, terminates at the apicial foramen. This portion of the tooth is peculiar in its organization. It presents, in its structure, the lacunæ and canaliculi of bone, and the cells of

which it is composed differ, in no essential point, from the cells of secondary bone or cartilage.

The Dentine is unique in its structure. It is composed of tubuli and intertubular substance. The tubuli extend from the pulp, in all directions, to the internal surface of the enamel and cementum.

The tubuli run in straight or slightly curved lines, and frequently send off branches, which, anastomosing freely at their distal extremities, finally terminate by lines or loops at or near the enamel surface; at times, they penetrate the enamel structure dichotomously; and, again, they are seen entering into the lacunæ of the cementum.

The central complex organ, the Pulp, is composed of connective tissue, blood vessels and nerves. Attention is frequently called to this part of the tooth in a very feeling manner; and the intelligent operator approaches it very cautiously, avoiding, if possible, by contact, any acquaintance with it whatever.

We find in a fully-developed tooth, as a general thing, but a single artery, vein and nerve entering the foramen of the root. But these tissues are so greatly multiplied in the pulp proper of the tooth that they amount to quite a plexus.

The contents of the dentinal tubuli is a mooted question. Among physiologists much the larger number, or nearly all of which, contend that their contents consist of fluids entirely, whilst a few state that dentinal fibrils have been detected in these tubes.

Mr. Tomes, one of the most erudite of English dental physiological writers, asserts most positively that he has, time and again demonstrated the existence of dentinal fibrils in the tubuli of the tooth, and attempts an explanation of the sensibility of dentine on this hypothesis.

It is not claimed that these dentinal fibrils are composed of nerve fibrillæ, but that they perform the function of nerve fibre; therefore, in a practical sense, it amounts to about the same thing.

It is further maintained that "with proper care in manipulating, nothing is more easy than to demonstrate the existence of the dentinal fibrils in a tooth which has been recently extracted. If a thin section be made," says this writer, "in a plane parallel with the direction of the tubes, and then placed in dilute hydrochloric acid, until the whole, or a greater part of the lime is removed, and the section be afterwards torn in a direction transverse to that of the tubes, many of the fibres will be seen projecting from the torn edges." Again this writer remarks, "It is not necessary, however, to decalcify dentine in order to show the fibrils. If a similar section to that already described be divided with the edge of a knife, many of these delicate organs will be seen; but they are usually broken off much shorter, many of them scarcely projecting beyond the orifices of the tubes." He also affirmed that Mr. Huxley observed, in a solitary instance, a fibre pass a short distance into the dentine. By Mr. Tomes it is also stated that the dentinal fibrils connect with the pulp, or proceed from it. But in what manner they originate, or whether they arise from the nerves of the pulp, he does not pretend to know.

Of the nature of dentinal fibrils, he remarks, "If a fibril be examined, in its natural condition, by the aid of an eighth-of-an-inch object glass, it will be found to consist of an almost structureless tissue, transparent, and of a comparatively low refractive power." It at present admits of a doubt whether the fibrils are tubular or solid. Yet he institutes the supposition that the fibrils consists of a sheath, containing a semi-fluid matter similar to the fibrillæ of nerves. But whether such an hypothesis can be sustained, he admits is yet a matter of much doubt. Again, it is claimed that the office of these organs is to conduct sensation and convey nutritive material to the dentine. Upon this point he comes to the following conclusion: "That the dentinal fibrils are subservient, not only to sensation in the dentine, but that they are also the channels by which nutri-

tion is carried to that tissue, and that, like other organized tissues, they may become the seat of morbid action."

Other physiologists, among whom may be found Huxley, M. Kolliker, M. Lent, Nasmyth, after instituting the most thorough modes of experiment and examination, have failed to detect any such structure as is above described. I am under the impression, and from what source derived I cannot say, that Lionel S. Beal, an histological writer, of considerable eminence in England, has said something upon the contents of the dentinal tubuli, and dentinal fibrils. I am inclined to the opinion that the appearance of dentinal fibrils in the tubes of the dentine, is accounted for by this writer as being due to the coagulation of albumen, or corrugation of fibrin formed in the fluid resident in them, or in some such way the presence of what appears to be fibrils, is explained. Yet I will not speak with any degree of positiveness as to what he does say on this subject, not having his work at hand for consultation.

Some three or four years since, Dr. W. W. Allport, of Chicago, whilst on a visit to Philadelphia, in company with Professor J. H. McQuillen, and myself, called upon Professor Josephus Leidy, of the University of Pennsylvania, for the purpose of subjecting to his inspection a section of a tooth prepared for the microscope by himself (Dr. A.), in which was seen something that had the appearance of dentinal fibrils projecting from the tubuli. Professor Leidy, after subjecting the preparation to a close microscopical examination, inclined to the opinion that the substance which projected from the tubes of the dentine, whatever else it might be, was neither dentinal fibrils nor nerve fibrils. And this opinion, I think, was concurred in by others present, excepting Dr. Allport.

Your Committee would most respectfully submit this entire question to the consideration of this body, either at its present or future sessions, hoping that it will receive that attention and discussion which its importance demands.

If it can be clearly demonstrated that dentinal fibrils penetrate and traverse the tubuli of the dentine, the question, which has reference to the origin of dental sensation, is at once fully explained and made luminous by the penetrating gaze of advancing science.

Dental Physiology has reference more particularly in its ordinary acceptation, to the functions of the teeth after eruption, or to the purposes they subserve in the animal economy.

The primary function of these organs in man is mastication, or the proper comminution of the food, preparatory to deglutition and digestion. In most of the lower orders of the animal kingdom, they perform a double office, that of defence as well as the preparation of food for swallowing.

Whilst in man they cannot be regarded, in any sense, as subserving the former purpose, yet their importance, primarily as organs of mastication, and, secondarily, as contributing directly and mainly to facial expression, should be properly recognized.

The primary functions of these organs cannot be dispensed with, both as it regards comfort and the perpetuity of individual being.

This point is so fully understood as underlying all the normal physical conditions, that the mere mention of the subject is sufficient for the present purpose.

Their secondary function, that of giving expression and beauty to the human countenance, should be thoroughly investigated; and the loss of parts involved in their removal from the mouth, which, in a few particulars, it is impossible to restore by any foreign appliance, in supplementing them, however beautifully and artistically wrought, should be as thoroughly canvassed and understood.

From the view taken of this subject, gentlemen, this paper points to the accomplishment of two very important ends, viz:

1st. Of producing, ultimately, in coming generations a perfect natural denture in regard to quality and character.

2d. The preservation of these organs, to advanced age, by the employment of such agencies as will inevitably protect against as well as arrest decomposition.

In relation to the first postulate, I regard its accomplishment as lying within the range of possibilities. The right, however, to use the requisite means for its achievement may be questioned, and even sharply contested, by the general practitioner of medicine, on the ground of its being without the pale of legitimate dental practice. Dentistry can be regarded in no other light than a specialty of medicine, and, if so, the right to medicate in this specialty must be conceded the very moment that this claim is based upon the requisite qualifications on the part of those assuming its responsibilities.

Therefore, the curriculum of study hinted at in this connection falls nothing short of what can be found in our highest medical colleges, with the addition of much that appertains to us particularly as a specialty. Indeed, gentlemen, the light of science, focalizing upon this point, and the demands from defective dental organizations which stare upon us at every turn, render it imperative that investigation be carried in this direction, and such practice instituted as will ultimately eventuate, if possible, in the production of natural dentures, which shall fully meet in quality, character and function, the life-long requirements imposed upon them.

The second end proposed, viz: that of preventing and arresting decomposition, is the acknowledged legitimate field for the display of the highest professional skill and erudition.

With none to question our prerogatives here, gentlemen, let us show ourselves workmen that need not be reproved or ashamed. Let us ever guard with ceaseless vigilance the precious treasure committed to our care.

Let us also, with Christian firmness, be quick to call in question and, if need be, to censure that practice which, for slight causes and for the want of requisite skill, sacrifices the natural for the introduction of the artificial.

DENTAL HYGIENE,

BY

HENRY S. CHASE, M.D., D.D.S.

The importance of the subject upon which I propose to make a few remarks, well deserves an extended and comprehensive essay, which I hope some one who feels equal to the task, will give this Association at its next annual meeting.

It seems to me that no department of Dental Science has received so little attention as this; and certainly there is none more worthy of the profound study of our best minds.

As the art of preserving the natural organs of mastication should excite our highest ambition, therefore let us endeavor to understand those great basal principles which must sustain and give vitality to our hygienic and therapeutical applications for its accomplishment. I have long thought that we are too much in the habit of looking on the surface of this subject, instead of searching for those apparently obscure, but really patent principles, which will, when understood, illuminate Dental Hygiene so perfectly that "he who runs may read." To me, it seems that our study should commence with embryo life. Not only must reparation and decay demand our earnest attention at this early period, but the equally subtile process of disintegration produced by hereditary and constitutional pathological influences.

No one, I think, who has had many years' experience, can have failed to observe his thoughts continually recurring to the operations of nature at this period, on each presentation of cases involving uncalcified enamel, or dentine.

Starvation, Hereditary Disease, Drug Disease. These three monsters leave their unmistakable footprints on the teeth of a majority of the American people, and very probably on those of all civilized countries.

Mothers starve the teeth of the embryo, the infant and the child. The embryo receives the Liquor Sanguinis impoverished by a lack of phosphates and carbonates, which nutritive cells seek for in vain, after having been appropriated by the voracious cells of her own bony tissues. The infant is starved in like manner. The mother's milk which should be rich in the Salts of Calcium, is as deficient in these important materials, as it is also in nitrogenized products. That ruin may be well-nigh complete, the child is slowly poisoned with a diet which was originally deficient in, or from which has been abstracted the Heaven-bestowed materials for perfectly-formed, well-calcified and beautiful dental organs. Unclosed enamel sutures, and soft and sensitive dentine, are unmistakable signs of the monster, starvation.

But what shall I say of hereditary disease, that Hydra, whose open jaws voraciously devour more innocents than we have yet had the imagination to conceive; Syphilis, with its notched and perforated enamel; Consumption with its coat of pearl or alabaster, like a whitened sepulchre hiding the dead body of the dentine? My pen and brain alike refuse the task of depicting, at this time, the horrible ravages of these monsters.

Scarcely second in size, and still a behemoth, is the third monster, Drug Disease. Shall I recount the oft-told ravages of mercury, or depict the devastations of its unwritten history? Dwarfed in size, irregular in form, and tardy in their eruption, the victims of mercury show unmistakable evidences of their conflict with this great enemy.

Brethren, the time has come for us to fight and destroy these enemies.

The Medical Profession (I am sorry to say) has stood silently

with folded arms, and often with closed eyes, while millions upon millions of dental structures have gone down to premature graves.

It is a work for each one of us to do. The great work of instruction must be earnestly begun. Women, and especially mothers, must be taught the anatomy and physiology of their teeth, and the chemical relations which food bears to these organs. Men and fathers must be learned that God's moral laws cannot be violated without punishment, even to the third and fourth generations. Physicians must be taught that nutritive dental processes are constantly interfered with, and often completely thwarted, by ignorant and unwarrantable exhibition of drugs in massive doses. And, finally, the Dental Profession itself, must shake off the dust of the past, and resolve for itself that the charge of ignorance shall no longer be justly valid against it.

Mr. President, I find that the remarks which I made this morning in regard to hygiene, are by some considered impracticable; and that it is useless for the dental practitioner to attempt to control the nutrition and development of the infants' teeth. It has been said that we must take teeth as we find them, and perform such surgical operations as we may consider best adapted to their preservation and health, entirely ignoring the great truth that it is the paramount duty of the dentist, as well as the physician, to prevent disease. Now, sir, I am not content that our noble profession should remain a mere mechanical one. My ambition, sir, is that we shall not only be Dental Surgeons, but Dental Physicians, which latter term I use in the most liberal and comprehensive sense. The time is fast approaching, sir, when he whose ambition extends no further than to perform good operations on the teeth as he finds them, will be left so far behind in the grand march of dentistry that he will never be able to overtake the camp followers of the noble army of intelligent practitioners.

Mr. President, notwithstanding that I may be charged with vanity, I shall risk the expression that I know that control of the nutritive processes are practicable, and that prophylactic measures may be taken at the earliest period of development and growth, against imperfectly-formed and diseased dental structures. Without vanity, I can honestly and religiously say, that an experience of over twenty years, controlled by these views, has shown me results which some of my brethren seem to think cannot be attained. Patient and persevering efforts in the instruction of the public, will certainly attain in a greater or less degree, the object aimed at. To accomplish the greatest good, a general movement must be made by our whole profession in this direction.

DEVELOPMENT AND REPRODUCTION

OF

ANIMAL TISSUE.

BY T. L. BUCKINGHAM, M.D., D.D.S.

Mr. President, —

The time is past when we should confine our discussions to the practical operations of our profession. There was a time, and that not long since, when these discussions on operations were of the most importance to us. But we have now become so familiar with each other's mode of operating that we can leave it for a short time and consider some of the fundamental principles of our profession. And as we have to operate on living tissue, both in its normal and abnormal conditions, a few minutes devoted to its development and structure may be profitably employed.

When we investigate any subject we should at the very commencement begin with the first principles if possible. In chemistry we take the ultimate atom as the starting point. In anatomy we should, when it is practicable, commence with the lowest form of organized structure, and from it follow up to the higher conditions of life.

In order to make myself clearly understood, it will be necessary to review some of the theories that have been advanced for the development of animal tissue. And as it is not my intention to follow the various theories through all these changes, nor even to mention them in this short paper, it will

be only necessary for my purpose to refer to the theory advanced previous to the one that is now held by nearly all physiologists. During the greater part of last century it was thought that all animal tissue was formed from fibrine, one of the constituents of the blood, which developed itself into fibrils, and from them all the various tissues of the body was formed. This fibrine was known by various names, as plastic matter, blastima, cyteblastima. When the microscopic investigations became more perfect, small globules, granules or molecules were thought to have been discovered in the blastima, which were then supposed to be the ultimate constituent of all animal organism. It was contended that these globules arranged themselves in a line and formed the fibre. The globule was taken to be in organic structure what the atom was in the inorganic, the starting point of all animal tissue. And even where the cellular theory was first advanced it was imagined that a cell was formed by a number of these globules arranging themselves in a form to produce the cell, and as there were seen in some of the cells small dark bodies it was supposed that they were enclosed when the cell was formed.

The theory now generally held is, that all animal tissue is formed from cells, and that these cells invariably come from parent cells. Verchow says, "Even in pathology we can now go so far as to establish as a general principle that no development of any kind begins *de novo*, and consequently as to reject the theory of equivalent (spontaneous) generation just as much in the history of the development of individual parts as we do in that of entire organism." "Where a cell arises, there a cell must have previously existed, just as an animal can only spring from an animal, a plant only from a plant." Let us now explain what we understand by a cell, although this may not appear necessary; still, if we all start with the same idea, we may reasonably expect to arrive at the same conclusions, which we certainly could not do if we started with different views.

A cell in anatomy is a little bag, or bladder, containing a fluid or other matter (Webster), and this is perhaps as clear a definition as we can give of a cell in so few words. If we take a bladder and fill it with a fluid, we have a tolerable good representation of an animal cell. A vegetable cell differs in having an outer coat, which is called cellulose. But a cell is not only a sac containing a fluid, but in most cases it contains a nucleus attached to the inside of the sac, and this again has a small speck in it which is called a nucleolus.

Taking a cell as the lowest form of organized structure, let us examine its mode of nourishment, and the manner in which it reproduces itself. Being a closed sac, with no apparent opening, it must be nourished by what is termed osmose. The fluid containing the nourishment must pass in through the membrane, and after it has performed its office it is discharged again through the same membrane. This circulation is not limited to living tissue, for if two fluids of different densities be placed on opposite sides of a porous membrane, or any other porous substance that the fluids will wet, they immediately pass through and mix together, until they are both of the same density.

But the fluid does not only pass in and out of the cell; it is changed in the cell by a power which resides in the cell itself, and is called its life force. A portion of the food is appropriated to the nourishment of the cell and the surrounding intercellular substance, while the rest, with the materials that have performed their duty and are no longer required, passes out. I mention this process here, as I believe it is the manner in which all tissues are nourished, as well as the way in which they are built up in the first formation of them.

The nerves may send a force to stimulate the cells to action, and the blood vessels carry the fluid necessary to support them, but the power of appropriating this nourishment resides in the cells themselves, and hence they are to be considered the active parts of organized tissue.

Cells may be reproduced by two processes. The parent cell may contain a number of nucleoli which may grow into cells, and as they enlarge they burst the parent cell, and escape, This is repeated again in these new cells; in this way, cells are sometimes produced very rapidly. Or a cell may sub-divide, by becoming contracted in the centre, until a complete sub-division takes place. Cells are multiplied in this way in the lower orders of plants, where each cell becomes an individual plant, living and acting alone. In some plants, the cells separate; in others, they are held together by a gelatinous fluid, although they perform their functions individually. In these forms of life, the cell being the whole animal or plant, they invariably produce cells similar to the parent, so that it is but the repetition of the parent cell; but, in the higher forms of life, where the plant or animal is composed of cells of a different kind, we must look for a more complicated process. If we examine a plant of a higher order, we find roots, stem, leaves, flower, and fruit. As these all differ from each other, they must have cells differing also; and, by following the changes through which a plant passes from the seed to maturity, we may see when the different cells are produced. In the seed there are the roots, stem, and generally leaves, already formed, with sufficient nourishment to start the plant growing. When this seed is acted on by heat and moisture, the roots begin to develop and grow down into the soil, the stem points up and the leaves expand to the air and light. During this time the plant is living on the nourishment prepared for it by the parent. If the light is cut off the plant will grow no more than the food which has been prepared for it will supply its wants, as it has no power to prepare its own nourishment without light. But if the roots find moisture in the soil containing the materials necessary to support the plant when it is acted upon by heat and light, they take it up and it is carried up into the leaves, where it is changed and returned to the stem, where the cells elaborate

it into new cells or apply it to perfecting the cells which have already been formed.

If we continue our observations we will find that, while the root produces root-cells, and the stem cells which go to form and enlarge the stem, there is also formed a class of cells which produce the flower and the fruit. Now, as we cannot observe in the embryo any sign of these fruit-cells, and as they are not developed until the plant is at maturity, we must conclude that they are another class of cells, formed from those differing from them. How this change is produced we are not able to explain; but that it does take place every one must admit. Nor is this new formation limited to a single class of cells. For we first find those that form the bud, then the calyx, the corolla, the stamina, and pistil, and each of these several parts may be sub-divided into parts differing from each other, so that we have not only one class of new cells formed, but quite a number of them.

And the most curious part of this whole process is, that no one of these individual parts is capable of forming a cell that will produce the fruit. This must be done by two of them, the cells of which unite and form a compound cell, which has the power of reproducing the plant.

I have thought it better to explain how plants grow, before we proceed to the growth of animals. We can examine the various changes that take place in them much easier than we can in animals, and as we proceed, we will find that they do not differ so much from animals as it was formerly thought they did. If we were to take the oviparous class of animals, that produce their young from an egg, the similarity beween the manner in which they are reproduced is very striking. But, as we cannot follow all the various classes of plants and animals through their numerous changes, we will take the highest class of animals next, and see how they are reproduced. In the female, a small cell is developed in the ovary, which has no

power of reproducing other cells, or of living for any great length of time itself, but if this cell come in contact with a sperm cell from the male, the two coalesce, and the compound cell has the power to reproduce cells, and these again cells differing from themselves, so that the various tissues of the body may be said to come from these two cells after they have been joined together.

It is not supposed at the present time that these two original cells contain the embryo of all the organs in the body, but that they produce cells similar to themselves until other tissues or organs are required, and then a cell is produced that has the power of forming other cells similar to itself, until the organ acquires a certain size and shape, and then the reproduction of cells is limited to the number required to keep the organ or tissue in its normal condition.

The growth goes on in the fœtus just as it did in the plant, with this difference: the plant has its food stored up in the seed to sustain it until it can draw its nourishment from the soil and air; while the fœtus lives by food furnished by the mother until parturition takes place, and the offspring is able to digest its own food and sustain itself.

Allow me here to repeat, that the theory now generally held is, that all animal tissue is developed from cells, and these cells invariably reproduce cells similar to themselves, and also that they are derived from parents; that the creation of a new cell never takes place, unless where a new organ or tissue is required, and then a cell is created by the action of other cells differing from them in its functions. How or why this new creation takes place is not known, but nature, where necessity requires it, always has a way of accomplishing her ends.

We might find examples of this in various operations in nature, but we have not time to trace them out. Allow me to mention one single example which is seen amongst insects: The honey bees have but one queen bee in the hive; she lays all the

eggs to produce another swarm; if by any accident she should be destroyed the other bees go to work and form a cell from which come another queen bee.

We have now seen how the various parts of the body are developed and increase in size, let us now examine how they are reproduced or repaired when lost or injured by accident or disease.

There is always an effort made by nature to restore a lost or injured part to its healthy, normal condition. In man, and the higher order of animals, this power of restoration is very limited, but in the lower order of animals and plants it exists to almost an unlimited extent. The power to reproduce the various tissues in man differs very much, — some of the tissues are reproduced to a much greater extent than others. Bones, cartilages, blood-vessels, and nerves, are frequently reproduced to a surprising extent, while muscles and some of the organs of the body, when once lost, are seldom if ever reproduced. But in the lower order of animals, the reproductive power is very great, — in some, not only a part of an organ may be reproduced when it has been lost by injury, but a whole organ will grow again, and that, too, when the organ appears to be a most essential one to the existence of the animal; and in some cases a whole animal will grow from a very small part of another.

Take the hydra, an animal that belongs to the zoophytes, a class resembling very closely some of the water-plants. If its tail be cut off, a new tail will grow on; and when the head is removed, a new is formed to supply its place; and should both head and tail be cut off from the body, to the head will grow a new body and tail, and to the tail a new body and head; and the body reproduces a new head and tail. The animal may also be turned inside out, and still it will perform its digestive functions without any apparent obstructions by being turned. These animals resemble plants in being able to reproduce

themselves. We know if we take a small sprig of some plants and stick it in the ground, roots are soon developed, and a new plant springs up with all the functions of the parent one; or the root will produce a new stem, if the stem should be removed; in fact, it is a common way of propagating some plants, either to plant small parts of the stem or roots.

We might follow this reparative power up, and see how it diminished as we passed up to the higher order of animals; but as it is not our desire to make this paper larger than is necessary to explain the reproduction and repair of parts in the human family, allow us to pass at once to these. Nor is it my intention to compare the reproductive power in the various tissues in the body, although it might be very interesting to do so; but I simply wish to show how any one or all of them may be repaired or reproduced. Let us take a long bone that has been fractured. A simple fracture will answer our purpose better than a more complicated one. The reparative process is the same in a simple fracture as it is in the more completed cases. We find in the most simple cases, where a bone has been fractured, the ends are drawn apart. If the ends are brought close together, and held quietly for some time, the bone may unite by what in the soft parts is called union by the first intention. Whether in these cases the old cellular tissue on the ends of the broken bones unite by a kind of adhesion to each other, or new cells are thrown out between the broken ends which join them together, is not clearly known. In the soft parts there appears to be no new tissue formed, but original parts coming in contact they unite as they were before they separated; but where the parts are held some distance apart it requires some new tissue to fill up the space. This space is first filled with blood which comes from the surrounding vessels that have been ruptured in a shorter or longer time; the blood is absorbed, and its place occupied by a fluid

which has received the name of plastic matter, fibrin, or lymph. The theory formerly advanced, and which is held by most of the pathologists at the present day, is, that this lymph itself becomes organized, or that cells are formed, created in it; that these do not come from other cells, but they are a production of the lymph; here each cell has been created, — which is opposed to the theory advanced by Virsham and some others, that no development of any kind begins *de novo*. The theory advanced by them, if I understand what they have written, is, that this lymph is only thrown out to protect and nourish the new cells, they being produced from the old one by either the nucleus and the nucleolus growing and forming new cells, or by segmentation of the original cells. As there is a large amount of this lymph thrown out, the cells increase to a greater number than is required, and the excess goes to form the provisional callus which surrounds the injured parts; when the new bone becomes more consolidated this excess is absorbed until the bone is restored to its original size.

If this theory is correct, it shows the importance, in every surgical operation, of saving, when it is possible to do so, a portion of the original tissue. The periosteum, we know, will form bone, and on the bone will grow a new periosteum; but if both are destroyed, to any great extent, no new bone will be formed.

What I said about the reproduction of bones, will apply to all the other tissues of the body; each tissue produces cells similar to those composing it. That the lymph does not produce the cells, is evident from its being of the same composition in every part of the body; it would have great power in discriminating to produce just the kinds of cells required to build up the tissues that had been injured or lost.

But if, as Virshaw states in his cellular pathology, the cell is the active part of the whole animal tissue, and the other is but

passive, then we must look for most, if not all, of the pathological changes to take place in cells. This is a step in advance of those who contend that inflammation can only take place in parts supplied with blood, unless they refer to the phenomena of inflammation, and not the real cause of it. When the term inflammation was first adopted, it was because it was thought to resemble, in some respects, the phlogiston in chemistry, or more properly, a burning up of the part. The term phlogiston has been stricken from the chemical terms, but retained still by the physicians.

If the cause of inflammation is due to the action of the cells, it may take place in any part composed of cells, although the different parts may differ in appearance when in this state. The soft parts will swell and become red, their temperature be increased, and they may be more or less painful; but these are the phenomena of inflammation, and not the cause. Dense structures, such as bone or dentine, cannot swell or enlarge, nor the last become red, for red corpuscles of the blood cannot enter the tubuli, but it does become painful, and the temperature may be increased; but still the cells may be undergoing all the changes that may take place in those composing the soft tissues.

I have mentioned inflammation here at the close of my paper. The phenomena of it are present in almost all diseases of the human body; but it has been denied by some that it could take place in structures as dense as dentine. If the theory advanced is correct, we may look for it in this tissue as frequently as any other.

Allow me, in conclusion, to give a short synopsis of the main points of this paper.

First. — All tissues are formed from cells, and these cells come from parent cells; and, also, that the cells are the active parts of all tissues, the inter-cellular structure being passive.

Second. — Cells invariably produce cells similar to the parent cell, except where new organs are required, and then a new cell, differing from those which produced it, is formed.

Third. — As new tissue is formed from cells, so repairs or reproduction of tissue is also produced from cells.

Fourth. — The cell being the active part of the tissue, all changes, either in health or disease, take place through it.

I do not advance these views as original: they may be found in most of our recent works on pathology, although they have not yet made much progress in dentistry.

SPECIALTIES AND SPECIALISTS IN MEDICINE.

ADDRESS

BY

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Gentlemen of the American Dental Association:

It gives me great pleasure to meet here the members of so honorable and useful a profession as yours. The profession of Dentistry is one of very modern origin, and is that branch of the medical profession which owes its development and perfection most essentially to our own country, and is indeed, I think I may say, the one branch of the profession in which we Americans can claim especially the pre-eminence. To be an American dentist is a recommendation in all the principal cities of Europe, and although the medical profession in general, and the surgical department especially, has an honorable position in the literature and among the profession in foreign countries, it can hardly be said to have a claim to the title of any pre-eminence.

I have said that your profession was of comparatively recent origin. It is almost, I think, within the memory of many persons here present when it was regarded as a merely mechanical operation, little better than the higher branches of mechanical employment. Step by step it has developed itself to a degree that, in perfection, in usefulness, it does not, in my opinion, rank second to any of the single branches of medical

or surgical science; so that at the present day, to be without a dentist would be to be without one of the essentials of civilized life.

Now, in speaking of its having a mechanical origin, I do not intend anything disrespectful to it. My own especial branch of the profession is surgery, and, I might say, a part of surgery; and it is not very long since surgeons, as a class, occupied a position far less honorable and important than that occupied by dentists at the present day. In the middle ages, in Europe, so called, or rather in the latter part of the middle ages, from the fourteenth to the end of the fifteenth century, or thereabouts, surgical operations were performed by barbers. There was no distinction between those that performed a surgical operation and those that cut hair, and curled hair, and powdered hair. The duty of the surgeon was considered to be to perform an operation when he was directed, and as he was directed by a physician, and, when he had performed the operation, to retire and leave the case to the physician. And it happened, after a certain period of time, that these operators acquired a certain amount of knowledge beyond the immediate needs of operating, and were called upon to advise about operations, and about the treatment of cases after operations. And this was considered a great innovation upon the profession. It was considered something outrageous and disgraceful to the profession; and the man who should have consented to meet a surgeon in consultation would have been expelled from the faculty for consulting with a quack. I have in my library a work published by the President of the Faculty of Medicine, in Paris, entitled "*The Brigandage of Surgeons*," setting forth that they were asserting claims which, if allowed, would be the destruction and disgrace of the medical profession.

This comparison I bring forward for the purpose of sustaining the assertion that I make, that the difficulties under which the dental profession labors are nothing new. By speaking of

the difficulties under which you labor, I mean this: the difficulty and length of time which it has taken for the honorable, and educated, and competent men of that profession, to assert and maintain full equality in professional standing with members of the medical profession who practise other branches of it. That difficulty has existed in regard to every particular branch of the profession that has at any time been embraced by any particular class of men, and is not peculiar to the dental profession. It results from that deep-seated prejudice, for I can call it by no other name, that has existed from the earliest times and is inherent apparently in the nature of every profession, and that is, to resist innovations or changes in regard to the doctrines or the practices of that profession. This peculiar aversion to changes results from the nature of professional education, and is one of those things that is treated of by Lord Bacon in his *Novum Organum*, under the name of "Idols of a Class," or those things which prevent members of a particular class from seeing the truth in regard to their own profession. It is, and has been, one of the great obstacles to the progress of the medical profession. It is an obstacle which at the present day is partially, but only partially, overcome. It is the thing which has prevented a large number of men of genius and industry in the profession from embracing and following out the study and practice of a particular class of diseases, in such a way as to have perfected our knowledge of the nature and treatment of such diseases.

Now, the principle that I wish particularly to assert here is this, that the medical profession, in order to be most useful, in order to acquire its due influence over the community, in order to perfect its knowledge of the nature and treatment of diseases, must adopt a special course of study; each individual member embracing that course which he judges on the whole to be best adapted to his faculties, and leaving out to a certain extent others for which he has no qualifications. I advocate special studies

and special practice; and, although the words have been somewhat discredited, I advocate "specialties" and "specialists."

Now, I undertake to say that the very great opposition which this doctrine has met in the profession, is not founded upon reason or justified by the experience of the profession. It is an opposition which is working to the disadvantage of the profession, as well as the public, and to the manifest disadvantage of a very great number of the individual members of the profession; and therefore I wish to insist a little upon the point.

What are the natural divisions of the science and practice of medicine? Is there no natural division? I hardly think that any one would be so bold as to assert that there are, and ought to be, no natural divisions. For a long time, when the science of medicine was in a very rude and imperfect state, the members of that profession did study and practise all its branches; and, in the older works on Surgery, Pharmacy and Chemistry were as much treated of as the operations of surgery. Still, even at that time, there was the commencement of division, and the first was into Pharmacy, Surgery and Obstetrics. The next division which came was into Medicine and Surgery, Surgery being, as I have stated, the mechanical application in the manner already indicated. At a later period, there commenced to be apparent the distinction between the obstetrical department of the profession, and the separation between Pharmacy and Medicine was accomplished entirely. By degrees the distinction between obstetricians and medical practitioners came to be recognized in particular localities, in large cities especially, to a very considerable extent; so that medicine, towards the middle of the last century, might be said to be divided into Pharmacy, Medical Practice, properly so called, Surgery, and Obstetrical Practice; whilst yet it remained true in regard to the greater portion of the civilized world — the country in general, in America as well as in Europe — that the larger number of practitioners continued to practise all its branches, to collect and prepare their own medicines, to

practise Pharmacy, Surgery and Obstetrics. And at the present day, this is the case with a very large part of the profession throughout the civilized world.

Now, it is manifest — all experience and reason show — that men who practise medicine in this way practise it only in a rude and imperfect manner; that they neither understand Pharmacy, nor Medicine, nor Obstetrics; that, from the nature of things, they are incapable of acquiring skill in any one of those branches; that it is absolutely necessary, in order that there should be any progress in regard to the science or practice of medicine, that some of these should be excluded, and others proceeded with especially, by each individual member of the profession.

Let us examine the question for a moment. The Dentists, as a body, have, according to my own knowledge and observation, perfected the mechanical means of performing operations beyond what has been done in any other branch of the profession. They are better mechanics than the Surgeons, and their instruments for accomplishing the different objects which they have in view are more numerous and better suited to their purpose than are the instruments of surgeons. Now this is essential to the proper performance of dental operations. And how has this happened? It has been simply that there have been dentists, as a class, who have devoted their attention to that purpose; and we as surgeons never could have invented or perfected these instruments, and consequently could never have perfected dentistry. And that division of labor is a thing which, at the present day, is manifestly necessary, and which no one now disputes.

In regard to surgical instruments, there are two departments in which they have been singularly perfected. The one is in regard to those instruments which are used for crushing urinary calculi, which are the most admirably adapted to their purpose. How did that come about? Three men of genius at the same time happened to devote their whole attention to that thing — the crushing of stone — and they especially perfected those

instruments. And without that perfection of these instruments, the crushing of urinary calculi must have remained forever, as it had up to that time, a mere phantom floating in the mind without any practical application whatever. Therefore it was necessary in this particular that there should be special studies. The other branch in which I consider the mechanical means to be wonderfully perfected, is that regarding instruments for operations upon the eye. These instruments have been brought to such a degree of perfection, of delicacy and accuracy, that they are capable of accomplishing things almost inconceivable, and accomplishing them regularly, constantly, and without difficulty or danger. Now, how has this happened? It has happened in the same way; there have been a class of men who have devoted their attention to that subject exclusively, have thought of nothing else, have worked at nothing else but the perfection of means for the accomplishment of that which they saw before them to be done. But when you come to other things that have not been made specialties, the condition of our science is singularly rude and imperfect. There is nothing in our science at the present day which has the slightest claim to be respectable apparatus for the treatment of fractures. Particular individuals, by the attention which they have paid to it, and by an excess of superior mechanical talent or ingenuity, have been able to accomplish with the instruments which they use a considerable degree of success, but there is no instrument for any given fracture that can be mentioned, that can be taken by a person of ordinary good education of the profession and put upon the member in such a manner as to accomplish any perfect result. The greater number of the instruments which are used in the profession for fractures of the leg, and called "fracture boxes," are not anything better than dry-goods boxes, and simply serve to accomplish the result of concealing from the surgeon the position in which a limb may happen to lie. What is the reason of that? The reason is, that there never has been as yet any instance that

a man devoted himself to fractures as a specialty, and nothing else, and this is the one branch in which a specialty is most needed. They are the species of accident which are the most frequent, and which disable a man more than any other, and entail untold miseries upon him if unskilfully treated; but the instruments for the accomplishment of this purpose never will be reduced to any great perfection, until it shall be known that the devoting of time and talents to one subject leads to honor and not to being partially thrown out of the profession.

If I should be unfortunate enough to meet with a fracture of the jaw, the first thing I should do would be, not to send for a surgeon at all. I should send for a dentist. They have directed their attention to the mechanical means and apparatus necessary for holding the jaws in their place, to such an extent, that they are better qualified to make them than surgeons are, as a general thing, and, perhaps I might say, more than any surgeons are.

I might go on and point out to you that with regard to no one thing about them are the instruments used by surgeons, the best adapted to their purpose.

We are disputing, at the present day, all over the world what kind of sutures are the best to use. A great many of our instruments for the purpose of ligating arteries and performing similar operations, are singularly rude and imperfect, and their imperfection is only remedied by the skilful use of the fingers of the surgeons.

How is this to be remedied? It is to be remedied, gentlemen, by special study; by the profession changing its views upon that subject, and saying to the young men, when they are entering the profession and when they are about to leave the schools, that it is better for them to devote themselves to some particular branch of the profession, and try to understand it. I often have young men from various parts of this country, who are here to visit the West for the purpose of locating themselves in

their practice. They very frequently come to Chicago, and we are always glad to see them. We are very proud of our city, and if you want to get into the good graces of any Chicago man or woman, you have nothing else to do but to tell them it is a nice place. But these young men come here and they say: "What kind of a place is Chicago for a professional man?" Now that is a very hard question to answer, because politeness does not permit me to ask another question. I could say to the young man, that if you know any one thing better than the generality of the profession, it is a good place for you; but if you do not, it will be a bad place for you. And for those young men who are incapable of applying their knowledge in such a way as to earn their daily bread, incapable of using their knowledge for the benefit of any particular class of men, so as to make it desirable for them to call upon them, Chicago is not the place. That is the difficulty under which members of the profession labor when they would enter into practice.

How is this to be remedied? It is to be remedied, in the first place, by acting upon public opinion. The profession which listens with leaden ears to the propositions which come from members of it to change the time-honored usages to which it is subjected, is sensitively alive to intimations which come from the people who employ them. Public opinion in this country is law, and in order that the laws be made good, public opinion must be enlightened. Individuals are powerless, but ideas are irresistible; and the way to remedy it is to take the idea or fact that in order to make the profession useful and powerful, it must be developed and perfected in all its branches, constituting each one of these branches one body, each part of which co-operates in its proper sphere and most useful manner in advancing the interests of the whole profession.

Now, in saying that I am in favor of special studies and practice, in that way, I do not commit myself to anything; and the profession wont regard this as anything but a "glittering gen-

erality." Therefore I state that I think there ought to be Dentists to attend to the teeth, Oculists to attend to the eye, Aurists to attend to the ear, and special Physicians to attend to diseases of the heart and lungs and make the physical examinations which are so difficult, and a special class who will be able to use the microscope for special examinations; that there should be not only practitioners of obstetrics, but those especially devoted to different branches; I mean that the incapable obstetrical practitioners never should be allowed to use instruments; that there should be men qualified for that. And then in regard to surgery, that it should, in addition, have a number of branches. That in these there should be one branch devoted especially to the treatment of fractures. That there should be another branch devoted to the treatment of tumors, without absolutely circumscribing these departments by definite lines at the present time. When that is done, then the profession will cease to occupy the principal part of the time in its meeting or associations with quarrelling with quacks. The man who is thoroughly accomplished in any particular department of his profession is very little troubled by quacks. Then the public will come to know the usefulness of the profession.

The dental profession, at the present time, is not consulted in one case in a hundred, or one in a thousand of those which require the care of a dentist. That is because the medical profession is not educated to the proper standard, and does not tell these people as they ought to do, that in cases of difficulties about the teeth, they should apply to a good dentist.

The same is true in regard to Surgery. There are operations enough that ought to be performed, in every populous county in the State of Illinois, and which are not performed, to give employment to all the surgeons in those counties. They do not know that there is any man who applies himself to that particular kind of disease, and when they look around for information they look to that particular kind of advertisements in the

newspapers; and you know what kind of information they get there. I repeat, then, that the way of progress in the medical profession is in the way of special studies.

How is this to be brought about? I would not have you to suppose, by any means, that there should be a special school for every department of medicine and surgery. On the contrary, I would very much prefer that there should be no divisions whatever. And if I might be permitted to express an opinion upon a subject which may be delicate, it would be an opinion with regard to the dental profession, that they had better not be separated from the medical profession. I think it would be better for them to receive their education in the same schools and to the same extent as other members of the profession. And I think that in order to effect their education there ought to be and will be, perhaps not in my day, but there will be professorships of diseases of the teeth in every respectable medical school in Christendom. What is taught at the present time in most medical schools in regard to teeth, is the order and time of dentition; and then, in case the child is sick during that period, that the gums are to be lanced. In some schools there is a little advance upon that. But there is no medical school, so far as I have any knowledge, where the diseases of the teeth and the causes which produce them, the means of obviating them, the irregularities of the teeth and the means of correcting them; the best thing to do in case of any particular appearances of the teeth; I am not aware that in any institution, even to that extent, it is properly taught.

Of course there must be colleges of dental surgery, so long as dental surgery cannot be learned elsewhere. This is a want, and until we supply it, the practice of surgery must be necessarily, more or less imperfect. It is necessary, in my opinion, that the dentist should be an educated physician. It is necessary that he should understand the structure of the body beyond the teeth. And I will mention this curious thing about anatomy and

quackery. Anatomy in itself would not seem to teach a man much of a practical nature; but I have never yet seen an accomplished anatomist who was a quack, or a quack who was an anatomist. There is an incompatibility between the pursuit of that sublime science, which makes the two incompatible; and if you will fetch before me any man, whether he be a dentist or otherwise, and he will tell me all that is known in reference to anatomy, I will accept that man as a scientific man, without asking him another question. That is the foundation of all medical science, and therefore you must have that; and you must have, in addition to that, the knowledge of physiology. You must have an especial knowledge of the action of medicines, as they operate upon the human system, not to speak of those other branches of science and accomplishments, outside the profession strictly so-called, which are so necessary to give influence to science, to render man happy, to adorn his life, and make him a gentleman. I would have, in the first place, all the different classes of the medical profession educated in the same schools, to the extent of acquiring this general knowledge of which I have just spoken; and then I would have in each college not only a professor of diseases of the teeth, but I would have a special professor with regard to a certain number of other branches, at present of the diseases of the eye and ear, and of the nature and treatment of deformities of every kind. These branches have all acquired a degree of development which requires them to be treated from separate chairs; and when the student had got sufficiently accomplished in general principles, I would have him adopt that branch which he proposes to follow, and devote his special attention to it; and I would have these new chairs instituted from time to time as the wants of the community seem to require.

Medical science, which two hundred years ago was imperfect, has at the present time acquired a degree of development which renders it impossible that any one should master it in all its details. No intelligent man devoting his time to it can read all

the works connected with it that appear in the English, German and French languages, from one end of the year to the other. It is a physical impossibility. It is a physical labor that he could not endure. How then is he to become acquainted with the details of all the different branches, able to perform every kind of operation, able to prescribe for every kind of disease? In proportion as the science advances, it will become still more extended, and difficult. As each science is perfected, this is the rule. There will be further advances which at the present day it will be unwise, if not impracticable, to define.

I have said that the profession, organized in the manner in which I propose, should be formed of parts not in conflict with each other, but should constitute one harmonious whole. The dentists are capable of exercising a great influence upon society. They are a numerous, enlightened, and I am happy to say, wealthy and influential body of men, and we, with all our prejudices, cannot afford to leave them separate and standing off. The physicians and surgeons are capable of exercising a great influence in favor of the dentists, and they would, if better informed and more enlightened, exercise a greater influence than they do, by directing their patients always to apply to them for advice with reference to every question which might arise as to the teeth. This would be an advantage to the dental profession, and they would get it to a much greater extent if they were a recognized part of the medical profession, as they deserve to be. So with all the other different specialties; and whenever I see a man taking up one of these specialties, and for years together undertaking the labor connected with it, I say, "Go ahead, do what you can in that branch of the profession." I do not regard him as in any degree conflicting with my own or any other branch of the profession; I am happy to see it, and I carry my approval to the extent of recognizing the principle in branches of the profession of which I might have, myself, some little doubt. Such branches as the application of electricity to

diseases, about which our information is so imperfect and indefinite. I consider that the application of electricity, by an intelligent man, would probable be of great use, and therefore when a man undertakes that specialty, I think he enters upon a useful work, and one that it is necessary to make a specialty of before it can be relied upon by the profession generally. It is the same with regard to another class of practitioners — the movement-cure men. That term — "Swedish movement cure" — is an unfortunate name. The method of treatment to which it is applied, did not originate in Sweden, but is founded upon the principles of physiology, justified by experience, incapable of being applied by practitioners who have not the necessary knowledge, and promising, in the future, as it shall be developed, the relief of a large class of diseases which have been, heretofore, and which are, at the present time, to a great extent, beyond the reach of surgical treatment.

These, gentlemen, are the essential outlines of the ideas which I wish to present to you. "A word to the wise is sufficient," and therefore I need not dwell upon them. It has given me great pleasure to know that this Convention was a successful convention, and that it was attended by a large number of men from various and distant parts of the country. You have already received a welcome from your own profession here: that welcome was only the expression of the feelings of the general community with regard to yourselves and every other body which comes here for purposes so useful and honorable as yours, and therefore, from the harmony of your session, I have only to hope that it may be useful, interesting and improving, and if you ever need a place to meet in on another occasion, I would take the opportunity of asking you, on behalf of the medical profession and our citizens, to come back to Chicago.

REPORT OF THE COMMITTEE

ON

PATHOLOGY AND SURGERY.

W. H. ATKINSON.

Mr. President and Gentlemen of the American Dental Association.

Last year I essayed to present you with a report of the status of dental pathology and surgery, in which "Pathology" was defined to be "only perversion of normal function."

In pursuance of the general train of thought running throughout that report, will you permit me to examine, somewhat in detail as well as by the broadest generalizations, the subject of *Function* as the legitimate basis of physiology without a comprehensive knowledge of which, we can have no understanding of pathological science, the necessary foundation upon which to build the code of principles and practice of a beneficent surgery, general and special.

Let us enter upon the prosecution of our purpose by asking, What is function?

Function is the work of body; therefore the body to which it belongs must first be defined before we can make intelligible the particularity of the work or function we propose to explain.

The body is the machine through which is elaborated those movements denominated function, by the power that sets up and continues the motion or motions which constitute function.

So crude are all our apprehensions of biological processes that close definition under present classifications of ideas, language and beings is next to an impossibility. And yet we see

clearly enough that every body capable of function, must have being; which opens the question of how bodies become or are constituted individualities.

As our ideas dominate all effort at thought in whatever direction of our mental labor, it behooves us to look well to these, as we admit them to inweave themselves into our mentality, or we shall be without means of admeasurement by which to compare the unknown with the known, and accurately define the stages of apprehension of truism on the one hand, and dogmatism on the other, which are the extremes of mental propositions. The first announcement of any proposition must assume the aspect of dogmatism, where it remains until proven a verity; then it at once takes its only other normal status among proved aphorisms, which thereby becomes to all who are familiar therewith, simply a truism. To the novice, therefore, all is dogmatic in first textual pronouncement no less than to open vision; (perception) "matter of course"—(truism). Function, as usually defined, is an act so complex as to defy distinct definition, short of much preparation of classification and management of limitations as to what constitutes its character. Were we to pursue the subject in exhaustive analysis so far as now possible to us, we would be compelled to consider it as a whole as well as parts, whose conjoint agreements or disagreements constitute the normal and abnormal display of the complex activities involved in that which we denominate general function. This analysis leads us, not to the absolute, but to the attained limit of our understanding of what constitutes general and special function.

The body, as a whole, may be regarded as a sea, exactly analogous to the ocean, which is made up of its northern and southern, eastern and western members, with seas, bays, necks, estuaries, shoals and margins, without which, in due relations to the great ocean-bed, air, and other surroundings, there could be no tides, constituting the general function of ocean. Tide is perceptible to all observers in all bodies of salt water, but some

dispute would arise were we to assert that it was present in all bodies of waters, with the variation of degree only.

In like manner do the superficials deny function to all bodies less than or more ambiguous than the recognized divisions of organs constituting systems of organs, such as bones, muscles, vessels, glands, nerves, etc., etc., failing to perceive that each of these has also its primates, by whose presence alone it elaborates the function proper to each.

Thus the question is narrowed down to the seen and the unseen limits of movements, rather than as it should be extended beyond these mere effects of that which is function proper; which resolves itself really into the implicit obedience of a less to a greater force, quantity and quality being amplifications, and tempic and spacic transpositions and aspects of the one great principle of life which produces and presides over all possibility of function, mechanical, chemical and vital!

These three aspects of motion or function are involved in every movement, occult or open, simple or complicate, throughout the domain of organized beings! Hence, when we say a certain movement is chemical, electric or other modification of currental expression of life, it is known that our meaning is, that the motion is principally displayed in the aspect most apparent to the observer; one referring the action to the department with which he is most familiar, while another refers it to his accustomed interpretation. We may have tolerably correct apprehension of our solar system, as a whole, and yet be very little acquainted with that of the planets constituting it.

And were there not a unitary law of function which existed in and governed all bodies great or small, it might be well regarded as irrelevant to speak of the function of suns and systems of planets in this place with hope of a patient hearing. But since spectral analysis has brought us into tangible contact with, (and proved the presence of the predominant metals that constitute) the far-off stars to the crudest apprehension, we are

encouraged to give free rein to our ardent desire to know the certainty that—"all things differ but in degree," and that "each function" (when understood) "becomes the key to every other function of every possible body."

After our most extended and most minute survey of bodies in action, what has presented itself as the type of all functional activity as displayed in every body without a single exception? Answer—That which is usually called "*breathing*" is this example of "unitary function."

This is plain to all who are willing to take the pains to observe the essential movements of cells, tissues, organs, and systems; mineral, vegetable or animal throughout the entire range of these bodies complex and simple.

If then inspiration (diastole), placement (digestion) and expiration (systole) be the generic acts constituting all of function that is apparent to external observation, is it not conclusive that supply and waste, health and disease are dependent upon the degree and manner of the performance of this triune role, the basis of function everywhere? That which is necessary to maintain a body in fit condition to perform its functions, must be received from without in combination with much that is not only not needed but incompatible to the well being of the body to be sustained by the nutrient elements sought in food. This involves separation and election to appropriation or rejection of that which helps on the one hand or hurts on the other.

It is this mysterious election and repulsion which constitutes the basis of organic movement or function, which, when we shall have comprehended, we shall be able to accommodate ourselves to this law of being, and thus inherit a perfectly blissful state of existence that shall continue so long as the supply of the constituents of our being are within reach of appropriation! This happy consummation is foreshadowed in the universal dread of death and desire to live perpetually in some cognizable state of conscious existence by all forms of individual being within our power of perception.

If the function of desire spring from sense of need spontaneously reaching out for something to satisfy may we not as positively gather from the exercise of this universal passion to live, the proof that it will be gratified somewhere and sometime, as certainly as that the perfection of the organism from which springs hunger, thirst and sexual passion, is the specific end for which this correlation of organs was called into being?

The first two of these have especial reference to the individual, so that it may become supplied with the necessary constituents of its own body, expressly to enable it to store, after full self-satisfaction, an excess of the elements of being, for the purposes of multiplication when the favoring conditions may contribute to this end of individual existence.

All that is necessary to prove the foregoing assertion, as to the end of life, is to take a survey of two groups of any species of domestic animals, the one nearly starved, and the other fed to repletion, or to compare the wild animals that live in a climate of unvarying temperatures in which a constantly full supply of food is at hand, breeding at all seasons without reference to the time of year, with the same species of animals, whose habit of indulgence in the reproductive instinct is governed by seasons of abundance of food and the multiplicity or scarcity of the same varieties and species with whom to associate.

The ill-fed have no desire because they have a minus instead of a plus quantity of sun and earth presence stored within their proper bodies.

While the well-fed are in a furor of excitement, the moment they come within the sphere of influence of those having the opposite kind of vital endowment or presence, expressly that each may give to the other that of which it has to spare and thus equilibrize its own personality by fulfilment of the highest planetary act in producing a new planet of the exact equation of endowments of its parent stocks.

All bodies in a state of diastole induce currental movements

toward their centres, from the most unpronounced and finest to the most differenced and the coarsest examples of individual existences.

Thus we must accept the necessity existing among all bodies, whether it be pleasant to us or not, in the predominant stage of our development in which we are so prone to say the sentiency resides.

The fact is, the "me" resides in the whole organism as is proved by the cognition of pain and pleasure in the remotest parts, even more keenly than in the brain itself, the boasted especial seat of consciousness.

All well endowed beings must have association. Whether that be what we call congruous or incongruous, depends upon the proximity of like or unlike bodies with whom to intermarry; as instanced throughout civilized and savage life among men, no less than by the oft-observed examples of the so-called unnatural attachments among domestic beasts and birds.

Even Crusoe must talk to and associate with his goats, the rocks, the serf and the inconstant wind in the absence of the genus homo.

Association consists in spiritual, mental and bodily nearness. These three states or spheres have each its specific predominant method and character of acting and being acted upon.

We have been so long accustomed to say that associations were good or bad in character, that we have practically ignored the ONE government whose sway can be only good, by confirming our observations to relational conditions, which induced us to say that association was good for one and bad for the other, in accordance with the view we took of the importance of the bodies in association.

If we have injurious spiritual associations, exorcism is the cure; if mental darkness or deflections afflict us, education is the cure; and if incompatible or poisonous contacts (association) occur in our food, purgation is the means to restore the lost balance, so necessary to the enjoyment of our birth-right, to

be in the blissful exercise of every function of our complex existence.

The origin of bodies is traceable to unseen currents within an amorphous, plastic mass.

These currental lines have been denominated the movements of light, heat and electricity. All these must be in predominant proportion above their manifestations elsewhere to enable us to perceive them.

It has been said that we cannot cognize either of these agents, and that we measure their presence and operation by their effects on perceptible bodies? This is no anomaly in nature, for in the order of things we know and measure the character and condition of all alone by a process called comparison.

Thus all our advances are but successful provings by comparison of the unknown to the known propositions that have found lodgement within our mental receptacles.

The unitary source of these primal currents of force or power has been proven to be the sun, from whence they emanate, and towards which they tend in ultimate expression of movement, in completing not only this circuit, but all the functions of separations and combinations of all bodies in diastole and systole as parts and as a whole.

If then that which we denominate the sun's ray be the embodiment of creative energy, in direct and recurrent or deflected course for earth and every organism thereon, is not the function of light sufficient to attract and retain our attention long enough to see that light is life to every creature capable of storing it for use in its proper body? The ocean has been instanced as the great uterus, which is in a state of diastole or inspiration of light over that half of the globe which is constantly bathed in the sun-presence, and systole or expiration on the opposite or dark side, thus establishing the breathing or functions proper of the planet.

All terrestrial function then, must be a due admixture of sun

and earth processes, which are divisible into all possibility of phase of function, from simple passivity of chaotic mass to every variation of motion, segregative or aggregative, be it in mineral, vegetable, or animal, in simplest or most complex correlation and culture.

Concurrent currental dominion obtains throughout every possibility of natural body just as concurrent jurisdiction of municipal law holds the rein of government in communities of civilized men. They work together to the same end, viz, the well-being of the individuals over whom they are exerted, no less than the perpetuity of the larger bodies these compose.

Hence all the organs of the system, under this dominion of supply, are bound by a tether of sympathy commensurate with the importance of each to the whole and to each other, rendering health only predicable upon the exact balance of function in each and in all.

This currental dominion in living bodies has its analogue in municipal communities in a force as intangible and yet so potent as to be like it irresistible, which force is known by the name of public opinion.

This owes its power to concurrent consent of the mass of mind in the community to act together without question of the propriety of their so acting. So soon as they hesitate the charm is broken and the public furor ends.

The function of digestion, as a whole, as it occurs in terrestrial bodies, may be said to be the killing, complete and proper solving, and admixture in chaotic mass of the various foods upon which the particular body in which it occurs subsists.

This is the prehension and due preparation of food by the body appropriating it. But the act of appropriation (nutrition) depends upon the freedom of the body within its own especial atmosphere, from which it imbibes not only the food it seizes therein, but also the attenuated "sun-presence," without which no act can take place.

There are two aspects in which this is true, viz, in entire beings, and in the constituent cells of which tissues and organs are composed; but it is true of organs only in a subordinate and modified sense.

In the entire being, the cuticular and lung surfaces are the points of immediate entrance of "sun-presence," while cells are mediately supplied with the same from the mucoid sea, in which they are constantly bathed. The absorption into cells of infusorial mass, granular mass, living matter, blood, plasm, or nutrient pabulum, these being the various names by which the prepared food is known, takes place at the point where it becomes completed, and ready for systemic use; whether that be in the alimentary tracts, vascular tracts, or neural tracts, or in the extravascular sea of the juices out of which the cells are supplied with nutrient pabulum. Thus connective cells become links in the chain of transmission of life-presence (sun-presence) from the juices, (in which it is stored) to the muscular fibrillæ for the purposes of muscular movements. In proof of which let me state that connective or areolar tissue constitutes the lines of limit to all primal bodies, whether they be cells of any variety or ultimate fibrillæ or disk in which is elaborated and expressed the primal act of muscular function.

If, then, digestion be a function so subtle, it is evident, to be complete, each step or stage, in every locality, must be fully and freely performed to produce a blood stream pure in character, to sustain the body in health.

These steps or stages of preparation of blood from food, are difficult of delineation, but may be said to occur in normal activity distinctly pronounced in the mouth, stomach, duodenum, and intestines: less distinctly seen in veins, in absorbents, and in the juices of the flesh, or great sea of mucous mass, and finally in the individual cells.

As before asserted each body must be free, to enable it to perform its specific function. Now that which constitutes this

special freedom of bodies, is also the bond by which each is limited within a specific sphere of being and action, so as to afford an atmosphere, not only to whole bodies, but also to the primates (cells) which constitute them. Now this inter-dependent bond of service and freedom, as a whole, is the complete expression of healthy or normal function; while any excess of individual freedom, or any demand of excess of service from individuals, inaugurates unhealthy or abnormal exercise of function which is the inception of disease.

These, then, are the principles with which we must become acquainted before we can have adequate conception of what constitutes Pathology, or that which belongs to Surgery, which is one of the means to which medical men resort to remove pathological manifestations from the bodies in which we see them displayed.

The details of an intelligent "Surgery" are as various as the functional deflections that necessitate their adoption. Hence, he who has the conception of that which constitutes normal function, will be capable to detect abnormal activity, no less than the course of procedure requisite to remove the latter and re-establish the former. The more complete our knowledge of principles, the more beneficent and certain will our practices be.

Upon the Sympathy existing between the Teeth and the Viscera of the Human System; and, in particular, the Sympathy with, and Influence of the Gravid Uterus upon the Teeth, resulting in their Decay and Destruction.

BY

JULIUS CHESEBROUGH, D. D. S.

We are all well aware that there is a sympathy existing between one part and another of the human system, though the organism and function are widely dissimilar. But when we attempt an investigation of this sympathy, we find the subject of such great proportions that we are baffled at the outset in finding a starting point from which we may diverge, until we roam over the whole system. And in recounting the fruits of our investigation, pen and paper seem inadequate to record the vastness of the subject. In the study of this topic and the investigation of the facts which are always within our reach, we have an immeasurable field upon which to work.

In order that we may the more fully understand ourselves in this matter, let us start at the fountain-head, and first find out what the means of intercommunication is between parts so widely at variance with each other, and how its effect can be thrown upon a distant part, and not confined to the source of irritation.

Our brain is the embodiment of our being. Springing from this are intricacies so minute as to be hidden from the unaided eye, and that even with microscopic power are hardly visible. Yet this delicate film performs the labor and task ordained for it with perfect exactness. If there is no violation of natural

law, all goes on smoothly, but when once there is an interruption of the function, it runs as the lightning runs, in no direct course, but as the greater attraction leads it.

The Nervous System is comprised of two great structures: — the Cerebro-Spinal or nerves of Animal life, and the Sympathetic or Ganglionic or nerves of Organic life — their functions so separate as to be two systems, yet so intricate as to be only one — proceeding from one source, coursing in one stream. And how little are we aware of the intensity of union between these two structures, or of the immensity of the sympathetic system, and how little thought do we give it in the investigation of disease!

There is so much that remains hidden within human walls, that to the end of time there will be no perfect knowledge of humanity, and the more we investigate and learn, the greater is our ignorance apparent.

Medical science teaches us that there is an existence of power within the human system, that tell-tales upon a perfectly healthy part, the affliction of a distant part, when that which seems diseased is perfectly normal.

To find out what parts are more easily affected by this strange agent, who sends his power from part to part with lightning quickness, is worthy of our great consideration, and demands our study, our patience, our care.

I invite your attention to that topic which has for its consideration:

The sympathy existing between the teeth and the viscera of the human system.

I purpose to lay before you the result of the investigation I have made in relation to the functions of the system of Organic nerves, giving a citation of cases that have prompted me to these investigations, and how traceable.

And in order that we may better understand this matter I propose to give a brief description of the Sympathetic nerve, so

called from the opinion formed that through it is produced a sympathy between the affections of distant organs.

It consists of a series of Ganglia connected together by intervening chords, extending from the base of the skull to the coccyx on either side of the vertebral column. These ganglia may be each regarded as a distinct centre, from or to which branches pass in various directions.

Among these branches the ones mostly demanding our attention are those which communicate with the cerebral or spinal nerves, and primary branches to the arteries in the vicinity of the ganglia, and to the viscera, or proceeding to other ganglia placed in the thorax, abdomen or pelvis.

My investigations have been confined to the effect shown upon the teeth by these tissues, conveyed as their actions are from distant parts, more directly to these organs, than to any other.

The nerves that supply the teeth come from the Fifth pair, and we find that connected with the three divisions of the fifth nerve, are four small ganglia, which form the whole (this I desire to be impressed upon your minds) of the cephalic portion of the Sympathetic.

With the first, or Opthalmic division, is connected the Opthalmic ganglion.

With the second, or Superior Maxillary, is connected the Spheno-palatine or Meckel's ganglion, and with the third, or Inferior Maxillary, is connected the Otic and Sub-Maxillary ganglia.

These ganglia receive sensitive filaments from the fifth nerve and motor, and Sympathetic filaments from various sources.

The Sympathetic is divided for convenience of description into the Cephalic, Cervical, Dorsal, Lumbar, Sacral and Coccygeal portions.

I have told you that the Sympathetic takes its origin from the Spinal cord at the base of the skull, and being there divided into four ganglia which comprise the Cephalic portion.

These four ganglia are not only connected with the branches

of the Fifth pair of nerves, but extending downward, run into the ganglia of the Cervical portion.

In the cervical portion we find three ganglia; the Superior, Middle and Inferior Cervical.

The Superior has five branches: two of these only relate directly to the parts we are in relation with — the outer branch forming the Carotid Plexus, and the inner forming the Cavernous Plexus.

The Carotid Plexus, we find, communicates with the Casserian Ganglion and Dura Mater.

The Cavernous Plexus communicates to the third, fourth, fifth and sixth nerves.

Another of these branches of the Superior Cervical Ganglion (the internal) gives off branches, which join with branches from the Pneumogastric of the Thoracic of the Dorsal portion.

From the Thoracic portion arises the Solar Plexus, which supplies all the viscera of the body, the largest plexus of the structure, which divides among other into the Renal Plexus, radiating through the kidneys; the Gastric Plexus to the stomach; and in the female the Ovarian Plexus, to the Ovaries and Fundus of the Uterus.

By this we trace the line of continuation from Ganglia to Plexus, and Plexus to Ganglia, from the Brain to the Coccyx, and we can readily form an idea of the intricacy of this network that connects with its own Ganglia and that also of another series.

I have been thus particular in pointing out the minutiæ of these tissues that you may the more easily comprehend the relation of one part with another. Thus we see that in the female the Uterus, in connection with this chain or net-work, is in complete union with the Cephalic portion of the Sympathetic, and that also every other part of the body bears the same relation. Also that the Cephalic portion is in close connection with all other parts of the body.

Now, how often has it been the lot of all of us to have a patient come to us for treatment, complaining greatly of intense pain in the teeth, when, upon examination, we find those organs in their appearance perfectly normal. We at once tell them that those organs are healthy, and they at once disbelieve us, for the trouble is there, they know it, for they feel it. If we are not able to diagnose the case at once, and locate it, and remedy it, we are placed in that patient's estimation as ignorant of our profession, and the confidence they have in us is forever lost. The first case that aroused me in the investigation of this subject was one where the patient was suffering from continued pain in the stomach. This case was treated day after day, with no avail, by the physician in charge, and, as he afterwards told me, "it baffled all my knowledge of the healing art," "and would yield to no remedy I could apply." After a while the patient came under my hands for the repair of a partial set of teeth, and in examining the mouth I found a tooth badly decayed.

I suggested that as the nerve was exposed the tooth should be treated, and the nerve removed. After the application had been made on the exposed nerve, my patient was surprised to find the pain cease in the stomach. A second time this patient had the same pain and I found another tooth which needed care. Upon treatment all pain ceased in the stomach, and there has been no farther trouble to this day. And this case was the more perplexing from the fact that no pain whatever was noticed at any time in the teeth. A case in point happened to myself during the past winter, when I suffered agony from tooth-ache proceeding from an inflammation of the kidneys, and I have not an unsound tooth in my head. Treatment of the kidneys produced relief. Another, where the lungs were in a constant state of irritation, difficulty in breathing, restless nights, and profuse perspiration during snatches of sleep. All these troubles ceased upon the extraction of several worthless teeth.

I have recorded three cases of gout, two of which, to use the common parlance, were of the stomach, and one of the great toe. All three soon disappeared under treatment of the teeth. These cases, and all those which pass at our hands bearing upon this same nature of disease, are enough to rouse us to think out this matter and perfectly locate it, so that we may know just where the trouble arises and what the remedy is. The stomach, through the intimate sympathy, is often the unruliest of members, and one that requires study as much as any other organ. The liver and lungs with the rest of the viscera, must not be overlooked in the investigation of this subject.

But the complications of these organs, immense as they are, are simple beside that of one other organ, the study of which is of greater importance than all else combined, and I now call your attention to the "*Sympathy with, and influence of, the Gravid Uterus upon the teeth.*"

In presenting for your consideration, at the last meeting of this association, a paper upon the decay of the teeth of the human system, I then gave you statistics of a great number of cases, and of the ratio existing between the male and the female, and then made the assertion, for the reason of the difference of the decay being more in the female than in the male, that "child-bearing, with its thousand aches and ails, contributed more to this end than all things else combined."

I desire, for a few moments, to refer to those statistics, that we may better understand this matter, and to add other that I have since made. I gave you a record of 3,546 teeth extracted. Of this number, for six hundred and forty-one males, there were extracted 1,173, and for seven hundred and seventy females, 2,373, the ratio being nearly double, as 1.84 for males to 3.07 for females.

Of this number of females, (420) four hundred and twenty had borne children; and the number of teeth extracted from these patients was (1,856) eighteen hundred and fifty-six, while

from the (350) three hundred and fifty who had never borne children, there were extracted (517) five hundred and seventeen, the proportion in the former case being as 4.42 to 1.00; in the latter, as 1.48 to 1.00. Here is an abundant food for thought, in the investigation of all this disaster.

That there has been for a long time a knowledge that there was in the teeth an irritation following pregnancy, is patent to all who have ever taken any pains to notice the various phenomena attending this condition. By writers on obstetrics tooth-ache is considered a rational sign of existing pregnancy; and we have had the old adage handed down to us from doctors and nurses, "that for every child, a tooth."

I have told you of the origin of the sympathetic nerve, and of the intricate manner in which it is connected with the other nerves of the body, and with the arteries supplying all the organs of the system. Now we can clearly trace out the course of the Sympathetic from the Uterine-plexus to the Solar, from the Solar to the Thoracic portion, from the Thoracic portion to the Cavernous and Carotid plexus, and from these direct to the branches of the Fifth nerve, also to the Cephalic portion, whose entire ganglia are closely and intimately blended with the branches of the Fifth pair, and also with the Casserian ganglion; and by thus tracing out this course, we can see how intimate is the connection with the teeth. In noticing cases that have presented themselves to me, I have found, that in the earliest stages of pregnancy the influence upon diseased or decayed teeth was sure to be manifest. That conditions, which in a normal state of the system would not be noticed, are, in this, at once developed.

For instance, teeth will ache when slightly decayed, or inflammation set in, where in a normal state of the body none would take place. I have found by carefully gathering facts, that the period of gestation within the bounds of which, the most troubles are likely to arise and complications exist, are from the third

week to the twenty-second. Within this narrow boundary of time are wrought those changes which make the mouths of many women repulsive and hideous. I have said that tooth-ache was considered a rational sign of pregnancy. I think that it is *the* sign, for I have known no other which speaks as soon as this, or with the always attendant symptoms that speaks as surely.

The question may arise in some minds, why should the uterus manifest itself upon the teeth, in displaying its sensations, rather than upon itself. I can but regard the brain as the great central source of nerve power, to which all other parts of the nervous system tend. The great avenue through which action is conveyed, is through the Cerebro-Spinal axis, and it is only when that action is germinated in one of the sympathetic or organic sources that this avenue is deprived of conveying sensibility to the brain. In such a case the power or force must be conveyed through the organic system until it reaches the brain. If we look into the formation of nerve tissue, we find a great difference between the nerves of the Cerebro-Spinal structure, and the Organic.

In those of the Cerebro-Spinal System we find mostly tubular fibres; in the Organic, gelatinous.

The tubular is composed of a white substance surrounding an axis cylinder, and this axis cylinder seems to be the essential element of the nerve.

The gelatinous fibre seems to differ from the tubular, being composed of a material corresponding to that of the axis cylinder without any covering.

Each one of the Ganglia of the Sympathetic structure is a brain of itself, a nervous centre of less size and complex structure than the brain, but in all other points quite similar. Their body is composed of a reddish grey substance quite similar to the matter of the brain: a vesicular nervous substance, and within are found tubular and gelatinous fibres, some of which

pass entirely through the ganglia, others pass around and among the nerve cells before seeming to leave the ganglia. The nerves of the teeth can be classed among those of the organic structure, containing as they do, and as can be demonstrated by microscopic power, plexus and fibres like those of other parts of the system. Thus it is that in the organization of disturbance in the Uterus, that endeavoring to have that sensibility conveyed to the brain, the pain or morbid derangement is reflected from the Cephalic portion to the ganglia of the teeth, and so the pain is at once exhibited in these organs. Added to this the fact that the Reflex and Sympathetic nerves never sleep, and are therefore more susceptible of the changes that occur in the functions of the viscera, and which must be conveyed to the brain through the sensitive or motor fibres, and we can plainly see why the teeth should be effected under the influence of the Gravid Uterus. I have known many cases when there was no blemish and have at once told the parties that uterine derangement existed which subsequently proved that I was right. The complications of this derangement are so immense that it is hardly possible in the limit that this paper must assume, to more than touch upon the bare topics, much less enter into an explanation of the various phenomena attending the changes as they daily present themselves. I have seen cases when the teeth were decayed and the mouth in bad condition in the first period of gestation. As long as a paroxysm of toothache continued there was seemingly no derangement; but, when anything warm taken into the mouth relieved the pain, then nausea would begin to be felt. And I have seen one case wherein the patient could always relieve nausea and vomiting by exciting the exposed nerve of a tooth until it ached. We know that nausea and vomiting, the so-termed morning sickness, is generally the first symptom of pregnancy. I have seen so many cases of this annoyance relieved by the proper examination and treatment of teeth decayed, that I must urge you all, that whenever such conditions

do exist, first place those organs in perfect condition and you will find that you will relieve many a patient.

Do away with this cause, for you may strike at the head of the fountain. And if by so simple means you relieve a woman of that most distressing annoyance you do well. Passing the derangements which are productive of pain in these organs, as they sympathize so closely, let us look into those derangements which, in their course, complete the destruction of organs already tending toward that end, or begin the work which surely will do so ere the full time passes.

The sympathy with or action of the gravid uterus upon the organs of the mouth is such as to comprise within its folds all parts which are contained within the oral cavity. Thus we find that the secretions become changed, and both that of the mucous membrane and the glands is morbid in the extreme. From numbers of tests applied during early pregnancy, to the mucus and saliva, I have most always found constant acid reaction, reddening litmus in nearly every case. This test is such a tell-tale that I never fail to apply it, and it always tells me, what is desirable for us all to know, whether these secretions are normal or not. I have found that when the saliva and mucous were highly acid that the patient was most troubled with morning sickness. The consequent derangement of one function led the whole accessory organizations astray, so long as that derangement existed. Next to the examination of the teeth themselves, give the oral secretions your attention; test them thoroughly, and if of an acid reaction give such remedies as locally or constitutionally will change them. Very frequently you will find that changing the nature of these secretions will create a derangement in some other part of the mouth or system. You may have periosteal inflammation or little annoyances which need give you no alarm or baffle your endeavor. They can every one of them be combated, and you can bring your patient through triumphantly. Bear in mind, always, that the influence of the gravid uterus upon

the glandular and mucous tissues of the mouth, and I will go farther and include the alimentary track, is to excite acid secretions, and that this acidity must be neutralized, or destruction of these organs will surely follow. Inflammation of the mucous membrane of oral cavity, often takes place. This I attribute more to the morbid condition of the secretions, than to a direct sympathy; but it is, nevertheless, from sympathy that this derangement takes place. I can easily demonstrate the relation of the gravid uterus upon the mucous membrane, by giving you the course of the Sympathetic to the Cervical Plexus, thence to the sympathetic filaments which anastomose with the Glosso-pharyngeal and the Pharyngeal branch of the Vagus, which together form the Pharyngeal plexus, thus supplying through the Glosso-pharyngeal and the Pharyngeal, the mucous membrane of the mouth, fauces, and pharynx with nerve fibres. After the twenty-second week of utero-gestation, I have found less annoyance and less derangement. The secretions were more natural, but in some cases there seemed to be a continuance even after labor.

At about the fifth week do we see very plainly the work going on, and from this time until about the twentieth do we have the full scope of annoyance.

Although we see this derangement and sympathy cease upon the completion of gestation, yet there are cases and conditions where the existing trouble manifests itself long after the period of labor, in a derangement of the organs in sympathy with the Uterus. Thus I have seen a case wherein a fine formed young woman suffered for a year after the birth of her child with pain in the teeth, alternating with that of the Uterus.

This case was one that had perplexed the physician in charge, and the case was presented to the Medical Society for advice.

Being called upon and a statement of the case made to me, I at once suggested that the uterine derangement came from the teeth, and that these organs were the only morbid ones.

There was some doubt expressed as to this being a correct

diagnosis of the case, for she had no tooth-ache before her labor, and the pain in the teeth was since that event. I further suggested that the physician in charge should examine the mouth, and he would find decayed teeth, or allow me to do so and I knew I would. The next day I visited the patient and found as I had supposed, decayed teeth, four of them — wisdom teeth. I extracted three of them without giving her much pain, but the other one was the offender. While extracting it (Left Superior) it seemed as if the woman was contracting within herself, and suffered intensely from uterine pain. After a half hour, her pain ceased, and she was entirely free. I cite this case, being one of great interest, to show you how intimate is the blending of these organs. Had this case been well understood, how much pain and suffering could have been spared this poor creature; for she told me afterwards that "no one knew what agonies she had suffered." That it sometimes seemed to her that it would have been a gladness on her part to have died, to have been rid of the dread of an agony that was sure to return.

There are many cases whereby treating an exposed nerve during gestation, simple as it may seem, has relieved labor and made that which was painful before of little moment. The case of the patient who could relieve nausea by exciting the nerve in her tooth to ache, affords an instance of this kind. I prevailed upon her to have the tooth treated and relieve herself of the annoyance in that way. This I did, and removed the nerve from the tooth. Two days afterward she complained that she was in great pain in the Uterine region, and I at once pronounced it "false pains." I was sent for on several occasions, and was told that the pain was of such intensity, that unless the tooth was extracted, she was afraid of its working a premature labor. I knew the tooth was perfectly healthy, and questioned her as to her former labors, and if she suffered much. She said that her teeth had always decayed when she was in such con-

dition, and that her relief from morning sickness was always by exciting the nerves of her decayed teeth. That she had no pains during gestation, but always had an extremely hard and painful labor. Could it be possible that the pain she was now suffering would be a mitigation of that at full term? I thought it would, and explained it to her, and thought that she was suffering now rather than later, and so it proved, for she had a very easy time and little pain. I have, since this occurrence, had a similar case, which has confirmed me in the belief, that the simple treatment of the teeth may bring favorable results.

In the treatment of the first case, I was sorely abused for attempting such an operation as the treatment and extirpation of a diseased nerve. I had as much as I could do to convince outside parties that I was not wrong. Doctor so-and-so says you cannot or must not touch a tooth during this period; and many with whom I have spoken upon these matters have asked me, "can operations be performed during this period of gestation with safety?" Always. I have never found any trouble at all, never hesitated, on account of abnormal uterine conditions, one moment; never met with less success than at any other time, and have seen enough to lead me never to expect any.

I have performed all the operations pertaining to our specialty, at all times and seasons, in early stages and late, and have yet to see the first case that I cannot control and prevent any disastrous premature result. It is all twaddle that you cannot extract a tooth or operate for filling during gestation without incurring a risk of a miscarriage, or bringing on premature labor. I say you can, and it is only necessary that you should know the various phases of disease, and have the confidence of your patient. Without these I dare not dream what might take place, and I do not desire to know.

A question arises, which is:

Why should the Uterus affect the teeth and conjoined parts more than any other?

We should well know, that during this period of gestation this organism is more sensitive than any other. This is on account of the great increase of the size of the organ, and the consequent greater vascularity with the adjunct of greater supply of blood. But I consider the cause and full answer to the question to be the change which takes place in the nerves and tissues which compose the parts of this organ. In the natural condition, the nerves of the Uterus spring from the Cerebro-Spinal system, and are characterized by the peculiarities of that system. But during gestation they seem to change from that to the organic in structure, and the predominance of grey fibres, without any covering, is from three to ten times over that of the tubular, thus giving that organ more power and force, which devolves upon the reflex and sympathetic structures to transmit. And we may also assume from the constantly transpiring action that the ganglia of the sympathetic increase also, and uniting with the grey fibres, absorb these into one being, which makes one system, and through which the greater impressions are transmitted to the brain and other organs. For proof of this we have the condition of the unimpregnated uterus. I have never yet seen a case, and I have sought for one diligently where this organ exerted the first sign of sympathy with any other, and where impressions of pain or derangement was transmitted to other organs, as we have in the cases I have enumerated in the first part of this paper. But when the lightning has struck, and the germ begins to expand, then do we see at once that this organ has life within it, and is in sympathy with all that is around it of this human system.

That I have given you a faint glimmer of this light, the question may be asked:

What means are best for the prevention of this trouble?

First, there must be a thorough knowledge of the intricacies of sympathy from and to this organ.

Second, a knowledge of using means therapeutic to combat this abnormity.

Third, local treatment upon the organs involved, when they are within reach.

We have to subdue inflammation, and decompose morbid secretions. Inflammation of periosteal nerve and mucous tissue and secretions glandular and mucous.

Fourth, insist upon perfect cleanliness of the teeth to enable you to locate the cause of the decay, and

Fifth, confidence in yourself that you are equal to the emergency, and the confidence of your patient in your ability to work a salvation of these organs.

Were I to go into an explanation of the minutiæ of treatment I would tire your patience. I may have done so already, but I must beg pardon for so doing.

The immense importance of this theme, and the necessary study to enable us to thoroughly comprehend it, is so great that I must urge upon each one of you to investigate this matter for yourselves.

We can do an immense amount of good, and reduce the ratio of decay of the teeth of females to that of males, if we will.

We must educate our patients, and strive early and late to gain that knowledge which shall be of avail to humanity. If we neglect to do our duty, God will, in the day of judgment, pronounce upon us; but if we do it, and relieve our fellow-being of suffering, we can have the gratification of knowing in this life, that man's reward belongs to us, even if we fail to receive it.

SYMMETRICAL DISEASES OF THE DENTAL ORGANS.

BY

GEO. T. BARKER, D.D.S.

Read by T. L. Buckingham, D.D.S.

Symmetrical diseases of the dental organs are met with, I might almost state without exaggeration, daily, in the practice of the operating dentist; but, though thus frequent, I am not aware that anything more than a casual notice has been taken of them, no contributed articles on the subject having appeared in our dental journals, or general dental literature. In the hope, therefore, that this paper may stimulate inquiry and research, I am constrained to select the above title.

Before taking up the subject, it may be well to inquire what is understood by the term symmetrical. Dr. Dunglison defines the word, when used in this connection, to be "an epithet given to those parts of the body which, if seated on the median line, may be divided into two equal parts, and perfectly like halves; or which — if situate the one to the right, the other to the left of this line — have a similar conformation and perfectly analogous arrangement." Symmetrical diseases are therefore analogous abnormal conditions of corresponding structures, either directly on, or to the right or left of the median line. These conditions are dependent for their development upon some modification of the physiological process of nutrition; hence, in order to properly comprehend them, it will be appropriate to examine in what manner nutrition is normally performed, and in what way the nutritive material may be misappropriated or misdirected so as to favor, at some future time in the life of the organ or tissue, a predisposition to disease.

Nutrition, as witnessed in the human economy, is defined by the author previously referred to, to be "that function by which the nutritive matter, already elaborated by the various organic actions, loses its own nature and assumes that of the different living tissues, to repair their losses and support their strength." In order, however, that the nutritive matter may assume that of different living tissues, it is necessary that there should exist an affinity between some of the constituents of the nourishing fluid and the organ to be nourished. Each organ or tissue, while it nourishes itself, serves the purpose of an excretion, and deprives the blood of material, which, if not removed, might influence abnormally the growth or development of other organs. This elective affinity, or vital force, has been most interestingly described by Dr. Southwood Smith. He says: "In every part of the body, — in the brain, the heart, the lungs, the muscles, the membranes, the bones, — each tissue attracts only those constituents of which it is itself composed. Thus the common current, rich in all the proximate constituents of the tissues, flows out to each: as the current approaches the tissue, the particles appropriate to the tissue feel its attractive force, obey it, quit the stream, mingle with the substance of the tissue, become identified with it, and are changed into its own true and proper nature. Meantime, the particles which are not appropriate to that particular tissue, not being attracted by it, do not quit the current, but, passing on, are borne by other capillaries to other tissues, to which they are appropriated, and by which they are apprehended and assimilated. When it has given to the tissues the constituents with which it abounded, and received from them particles no longer useful, and which would become noxious, the blood flows into the veins to be returned to the pulmonic heart, to the lung, where, parting with the useless and noxious matter it has accumulated, and replenished with new proximate principles, it returns to the systemic heart, by which it is again sent back to the tissues."

It has been conceded by all writers on this subject, that the blood must, in order to properly nourish tissues, be in a certain condition, — some denominate it "purity," others a "right state and composition of the blood or other nutritive material"; but it is admitted, I believe, by all, that there can be no universal standard, as the blood in one person will possess certain characteristics, which it will retain through life, differing very decidedly from the blood of others. It is also modified by age, condition, climatic influences and others which it is needless to revert to.

All symmetrical diseases, except those depending on congenital defects, arise from some morbid material in the blood. We have seen that each organ attracts from the nutrient fluid certain constituents which it appropriates; but on an examination of symmetrical diseases, it would seem as if certain parts of organs which, in our present state of knowledge, would appear as identical, are yet endowed with a distinct affinity or appropriating power. Mr. Paget, in an able article on this subject, says: "Now, the evident and applicable truth in all these cases is, that the morbid substance in the blood, be it what it may, acts upon and changes only certain portions of what we might suppose to be all the very same tissue: such a substance fastens on certain islands on the surfaces of two bones, or of two parts of the skin, and leaves the rest unscathed; and these islands are the exactly corresponding pieces upon opposite sides of the body. The conclusion is unavoidable, that these are the only two pieces that are exactly alike; that there was less affinity between the morbid material and the osseous tissue, or the skin, or the cartilage close by, else it also would have been similarly diseased. Manifestly, when two substances display different relations to a third, their composition cannot be identical; so that, though we may speak of all bone or all skin as if it were alike, yet there are differences of intimate composition; and in all the body, the only parts which are exactly like each other,

in their mutual relation with the blood, are those which are placed symmetrically upon the opposite sides. No power of artificial chemistry can indeed detect the difference; but a morbid material can: it tests out the parts to which it has the greatest affinity, unites with these, and passes by the rest."

All our pathological museums abound with examples of symmetrical diseases, arising it may be from syphilis, rheumatism, or exanthema.

In my own collection in the museum of the Pennsylvania College of Dental Surgery, is the head of a female who died from syphilis, and the evidences of the disease are shown particularly in the symmetrical arrangement of the morbid material on the frontal and parietal bones. But to the dentist the dental tissues present evidences worthy of attention, — we all notice how prone the teeth are to decay in pairs — carious in corresponding positions — I was particularly struck with this fact in a case which recently came into my hands; the teeth were apparently all sound, but on examination I found in each superior lateral incisor on the lingual surface, a sulcus into which my probe freely passed, also giving evidence of deep-seated caries. A closer examination revealed to me that arrestation of the process of calcification had taken place while the teeth were in their formative stages. Another and as familiar an example is the eruption of the wisdom teeth, identical in shape, and with caries analogous in position and extent, the presence of pits upon the incisors, canines and bicuspids, notches in the incisors a proof of the syphilitic diathesis, all of which are such unerring marks of arrested nutrition, and which are confirmatory of the now almost universally received theory of the origin of dental caries, viz: the chemico-vital — that nutrition in teeth must be modified so that they cannot resist the action of external exciting or predisposing causes to decay. I will close this paper by relating a case which forcibly directed my attention to this subject: A gentleman applied for treatment for severe

toothache. His teeth were put in the best of order, but no relief was given. A perfectly sound superior first bicuspid he complained of as the offending organ; nothing seemed to alleviate it, and as a last resort the tooth was opened to the pulp cavity, when I found calcification of the dental pulp had taken place; as no relief could be given, the tooth was extracted. In a few days the opposite one commenced to give trouble, and in less than three months had to be removed from the same cause. These facts would seem to prove that the only parts of any organ or tissue that are identical are those that are located in symmetrical positions on the opposite sides of the body; and that these parts are liable to be acted upon simultaneously by any morbid influence if it exists in the nutritive fluid.

DISEASES OF THE DENTAL PULP, AND THEIR TREATMENT.

BY

F. Y. CLARK, D.D.S.

There is no operation that the dental practitioner is called upon to perform of more importance to himself and patient than the restoration of a tooth to health, usefulness and beauty, after the exposure of the dental pulp.

When looking back some fifteen or twenty years and viewing the treatment of the dental pulp then and comparing it with the course pursued now, one cannot but be impressed with the improvement which has taken place. In those days it was considered by the majority of practitioners the height of absurdity, if not quackery, to attempt anything short of extracting an aching tooth. How different is it now! Is it not now absurd, if not unpardonable, to resort to extracting in almost any case where there is the least chance for preservation? Such is my belief and general practice.

The most simple cases of exposures of the dental pulp are those caused either by accident in excavating, or the penetration of dental caries, in which there has been little or no inflammation. Under such circumstances the proper course is to excavate around the margin of the cavity, removing as much of the decay as practicable without inflicting pain, and shaping the cavity so that it will retain the arsenical paste. In making this application, which is composed of the usual ingredients, the aim is to avoid pain. To accomplish this, take a piece of wax about the size of the cavity, and making a hole through its centre, pass into it a piece

of common wrapping cord, three or four inches in length, allowing the end which is to pass into the cavity to project very little, so that it will come in contact with the pulp a little before the wax. On this end place a minute speck of arsenical paste, and then with a chisel-like instrument, with a slit from the point up its centre about half an inch in length and large enough to admit the projecting end of the cord, press the wax into the cavity, and with a pair of pliers withdraw the cord. The chisel instrument should be large enough to retain sufficient heat to press the wax into the cavity at almost a melting temperature, otherwise there will be pain.

It will be seen, that in this way there is a vacuum directly over the pulp, thus avoiding the pain generally produced by pressure, and that there is just enough paste left directly over the pulp, for the purpose required, and no more. I have been in the habit, and still prefer making the application in the morning, so as to remove the pulp, and fill the tooth the next day, leaving the paste in the cavity from twenty-four to thirty-six hours. On removing the wax, give the cavity the shape wished, and then remove all decay from around the walls, and over the pulp so as to have a fair view of the pulp. If this is found free from sensibility and loose in the cavity, it can be easily removed at one effort, severing it from the main branch at the foramen. But sometimes, owing to difference in temperaments, there will be considerable pain, and the pulp has to be removed in little fragments. When complete removal has been effected, I proceed at once to fill, being perfectly convinced that it is better to do so than to put it off until a second or third sitting. There are certain abnormal conditions of the pulp which fully justify delaying the operation of filling, and although familiar with such, and can generally tell them when they turn up, yet I may not be able to convey this knowledge to others as clearly as could be desired. Where a tooth has been aching for some time, with more or less vascular excitement, or where the pulp is in a chronic state of

inflammation, approaching suppuration, of course the treatment must be varied to suit each particular case. Sometimes when there is much congestion of the pulp, it is advisable to puncture it and request the patient to withdraw as much blood as possible by suction before making any application. In many cases where there is considerable vascular excitement, this simple plan will give relief. On removing the pulp from such teeth, and in some of different condition, considerable bleeding may be anticipated, and in such circumstances a second application with a thread dipped in creosote, and then fill temporarily for a week or two, will be found a good plan. Odd cases of a more advanced or chronic condition of the pulp, which may be classed under this head, occasionally turn up; such as fungus pulp, or where there is a hair-like part of the pulp still remaining, too small to be seen with the naked eye, but large enough to give acute pain, when touched. In such cases, the arsenical paste will be found to act with tardiness and should be substituted by an instrument or some other preparation more efficient and less dangerous to the surrounding parts.

I now come to another, and, what I will term the second condition of the pulp, which requires more care and precaution than any other condition in which it is found. I allude to that class of teeth where a discharge has been going on for months, and perhaps years.

It is generally the rule to proceed with a hooked or barbed instrument to the removal of morbid matter and decay from the fang at once; this should be avoided until a second or third sitting. A moment's reflection will show how very easy it is to choke up the little mouth of the foramen with detached decay, thus shutting off the discharge and making it hunt another outlet by creating an alveolar abscess. Again, it must be borne in mind, that when the collection at the apex of the fang has been discharging through the foramen for some time, that this little opening, which in an adult in a normal state is not large

enough to admit a hair, has become considerably enlarged, and will easily admit our common pulp instruments, thus in certain cases producing periosteal inflammation. In these conditions, I do little more at the first sitting than give the pulp-cavity a good washing out, using as a last injection tepid water, with a little alcohol; at the end of a few days, give it another washing and pack the fang with a thread saturated in creosote, and fill temporarily and let it rest for five or six days; at the end of this time, the discharge having generally disappeared, proceed to clean out the fang, avoiding instruments that will pass through to the periosteum. In these conditions it is best to keep up the antiseptic properties of the creosote, and in order to do so fill the fang half way up with compressed hickory dipped in creosote, and then fill on this with foil. In this way a more perfect and successful fang-filling can be obtained than can possibly be secured by the entire use of foil. The only objection would seem to rise as to the durability of the hickory; but who has not seen wood pivots that have stood the wear and fluids of the mouth for fifteen and twenty years? This being the case, is it not reasonable to conclude the same material protected by gold as mentioned, will last equally or doubly as long?

If after filling, notwithstanding all the precaution taken, periosteal inflammation is threatened, do not despair of success or be at a loss for remedial agencies. The first stage of trouble during vascular excitement is the time for preventive treatment; and, if judicious means are timely used, an abscess may be avoided. The first resort in trouble of this nature is electricity; the second is depletion, by making a deep incision opposite the end of the fang, and, after the bleeding, filling the wound with a bit of floss silk or cotton. Should these remedies fail, the continuance of preventive treatment is unadvisable, and the efforts should be turned towards the encouragement of suppuration.

I now come to a third diseased condition of the teeth, which,

although it only differs from the one last described by its having an alveolar fistula for the exit of matter, instead of through the crown, yet it requires very different treatment. In this class of teeth, as in the first, little or no trouble need be anticipated, and generally they may be treated with a certainty of success. The first step is to free the fang without clogging the foramen; then, with a small barbed instrument, wrapped with cotton, force creosote into the pulp-cavity until it comes through the fistula. Should the connection not be made in this way, then take a very fine-pointed nerve instrument and force it through the foramen, so that it will perforate the sack; then try the pumping process again, and if the creosote passes through, fill the fang as already described.

In giving the foregoing synopsis of my treatment of the dental pulp in its various conditions, I claim a few points as peculiar to my own practice, and perhaps better in some respects than that in general use, but do not wish to be understood as claiming anything superior to the peculiar practice of many members of this society who excel in this specialty. For this reason I have chosen this subject as an essay, believing that from such it would receive an honest and thorough dissection; that it would be fairly compared with their own practice — the good accepted and the bad rejected. In this department of dental science, as in all others, there is yet much hidden treasure that requires experiment and thorough investigation to bring it to light; and, if we wish to gain this treasure, so as to advance ourselves, our profession, and benefit mankind, we must be constantly on the alert, with ready hands and searching eyes, for the reception of all things, and hold ourselves ever ready for the adoption of everything that is good, no matter from where it comes. As said the apostle of old: "Try all things, and hold fast to that which is good."

ADDRESS

BY

N. S. DAVIS, M.D.

PRESIDENT OF THE AMERICAN MEDICAL ASSOCIATION, AT AN ENTERTAINMENT GIVEN BY HIM, AT HIS RESIDENCE, TO THE MEMBERS OF THE AMERICAN DENTAL ASSOCIATION, IN RESPONSE TO THE FOLLOWING TOAST, OFFERED BY DR. C. W. SPAULDING, PRESIDENT OF THE ASSOCIATION:

"To the President of the American Medical Association; Medicine, Surgery and Dentistry — departments of a common science, their disciples should constitute a common brotherhood."

Gentlemen and Ladies: — I am not only happy to be honored with your company this evening, but cheerfully respond to the sentiment just expressed by your honored President. That medicine, surgery and dentistry are actually practical departments of a common science, very few will be disposed to deny. I say common science in deference to popular custom. It would be more proper, however, to use the plural form of expression; for what is generally styled medical science is really an aggregation of many sciences, and their cultivation with direct reference to the prevention and alleviation of human suffering. The science of medicine, popularly so called, consists of facts and principles selected from every department of natural science, philosophy, psychology, political and social economy, and their application to the elucidation of the causes, nature and treatment of such diseases, deformities and injuries as are liable to afflict our race. Hence the student of medicine, in its general sense, is emphatically a student of nature. And not only so, but he studies the broad fields of nature for the highest and noblest of temporal objects, namely, to qualify himself for miti-

gating or relieving the imperfections, deformities and diseases of his fellow men; whether they occur in the teeth, the organs of special sense, the extremities, or the more vital organs within the body.

Medicine, surgery, and dentistry are all based upon anatomy, physiology, pathology, and materia medica. Without anatomy none of you, as dentists, can know either the structure of a single tooth or its connection with the jaw, gums, blood-vessels, nerves, etc. Without physiology, none of you could know the natural uses and influences of the several parts just named, or the relations of the teeth to the whole processes of digestion, assimilation, and nutrition. As pathology bears the same relation to organized structures in an imperfect or diseased condition, as physiology does to them in the natural, so without a knowledge of it, neither the physician, surgeon or dentist could know anything of the origin, nature, and tendencies of the diseases and defects he professes to treat. The materia medica, in its full scope, includes everything that can be made useful in the mitigation or removal of any of the ills to which man is liable. The gold that fills a cavity in a tooth, the wash that soothes an irritated gum, and the instruments used for adjusting both, are as much a part of the armamenta or materia medica, as are the pills and powders administered by the physician. These four branches of medical study are fundamental, and no man can do full justice, practically, to the most limited specialty without a thorough knowledge of them all.

Every member of your Association will acknowledge that a dentist should certainly understand the composition, structure and mode of development of the teeth, together with the causes that render their development defective, or induce in them disease and decay. But in a single tooth you have three out of the five primary forms of living, structural organization, namely, the fibrous, vascular, and nervous, with the peculiar arrangement of inorganic matter to give it solidity.

A knowledge of these structures, whether chemically, anatomically, or microscopically, involves a knowledge of the same structures in all other parts of the body. To understand the development of a tooth and its appendages, from materials selected from the blood, involves a knowledge of the blood itself, and all the laws that govern the intricate processes of assimilation, nutrition, and disintegration, in living structures generally. The same remark applies with equal emphasis to the causes of imperfections and diseases of the dental organs, and the means for remedying them. Indeed, there is not a living atom of our physical organization so isolated that a knowledge of its structure, nutrition, disintegration, and various morbid conditions, can be obtained, without developing all the essential facts and principles of anatomy, physiology, and pathology.

So far, therefore, as dentistry is a science, as distinguished from a mere mechanical art, it rests on the same foundation, and necessarily involves the same series of studies as all other departments of medicine and surgery.

Of late, much has been said about specialties and specialists; and there is, at this day, especially in our country, a manifest tendency to favor the multiplication of both. We are told that instead of a few leading divisions of medicine and surgery, we should have almost as many specialties as there are important organs in the human body; and that every individual member of the profession should devote himself to the study and treatment of some one class of diseases, or the diseases of some one organ or apparatus of organs. By thus concentrating attention upon a limited number of diseases or injuries, it is claimed that greater skill will be acquired in their treatment; and more advancement in our knowledge of their nature and tendencies. Division of labor and concentration of attention, is said to have been the parent of most of the discoveries and improvements of modern times. It is further claimed that the whole field of

medical and surgical sciences, with their practical application, is so extensive that it is impossible for one man to so master the whole, as to properly qualify himself for the practice of all its departments.

This process of reasoning is plausible; and, to a limited extent, true. It is true that in all the mere mechanical arts, the greater the division of labor, and the more perfectly each man is restricted to a certain series of movements, the greater will be the skill and accuracy acquired in their performance.

The Dentist who restricts his work entirely to the processes of filling teeth, may possibly acquire greater skill in that particular work (provided he has enough of it to do), than he would if he filled teeth, extracted teeth, fitted artificial teeth, etc.

The Surgeon who restricts himself entirely to the more important and delicate operations on the eye, or the ear, or the blood-vessels, may acquire greater dexterity in those particular operations, than if he attended to the whole field of operative surgery. But the rule applies properly, only to such operative procedures as are essentially mechanical; and cannot be extended to the treatment of diseases of particular organs, without causing more mischief than good. The reasons are obvious to every enlightened and reflecting mind.

First, the various organs of the human body are not so many isolated parts, the functions and diseases of which have no influence upon each other, but they are so intimately connected and mutually dependent, that not a single morbid impression can be made on one organ that will not exert a modifying influence on all the rest.

The same heart sends the blood to every organ and structure in the body. The same nervous centres radiate the delicate threads that are to impart sensibility or command motion to the remotest parts of our organization. And the same vital properties pervade every living atom. Every link in the chain of actions, constituting digestion, assimilation, nutrition, disintegra-

tion, and excretion, is so connected, that not one can be broken or marred without embarrassing the action of the whole. Hence it is literally impossible to comprehend the nature, tendencies, and results of the diseases of one organ, without studying their influence on all the others and vice versa. Hence there can be no such thing as specialism proper in the study of pathology, or the nature of diseases. The whole field must be studied before any one of its parts can be fully understood.

Second, the circumstances of civilized communities ever have, and probably ever will, prevent any extensive division of practical medicine and surgery into specialties, except in a few large cities and densely-populated towns. Much the larger part of the inhabitants of every country occupy the rural districts, where they are obliged to send from one to ten or fifteen miles for a practitioner of any kind. Now, suppose each member of the profession was devoting himself to such special diseases as he imagined to be most in consonance with his taste, and a farmer living five miles from his market place or business centre, should be attacked with acute pain in his side, and send for Dr. A. on the supposition that his attack was inflammation of the lungs. After ten or twelve hours delay, Dr. A. arrives, but finds on examination that the pain is certainly located below the diaphragm, and of course no disease of the lungs. Inasmuch as the diseases of the lungs and throat constitute his specialty, the case does not belong to him and he retires. From six to ten hours more are spent in getting Dr. B., whose specialty embraces the diseases of the abdominal viscera or digestive organs. But, on examination of the case, Dr. B. finds the acute pain in the side of his patient to be neuralgic and dependent on the disease of the spinal cord, or its membranes, at the origin of the nerves affected. This places the case out of the range of Dr B.'s practice, and makes it necessary to send ten miles to a neighboring town for Dr. C., whose specialty embraces diseases of the cerebro-spinal nervous system.

Again, suppose the farmer, instead of having been attacked with a pain in his side, had fallen from a load of hay and broken his leg, and wounded an artery in his hand.

A messenger is sent in great haste to the nearest town for Surgeon A., who comes, perhaps, with a new and improved fracture box, and dresses the broken leg with much skill and dexterity. This done, he asks for his fee, and takes his hat to depart. Hold, Doctor, exclaims the patient; you have dressed my leg, but are you going to leave me to bleed to death from this wound in my hand? Oh, my dear sir; blandly replies the Surgeon, that is not in my department. I attend only to fractures or injuries of the bones. For injuries and diseases of the blood-vessels, you must send for Surgeon B., in the adjoining town. Without multiplying illustrations, is it not obvious that specialties can be made practically beneficial only in populous towns; and even in them only to a limited degree? It may be said that the cases cited as illustrations are of the nature of emergencies, which every professional man must be prepared to treat, at least temporarily. But how is he to be prepared to treat such cases, even for the briefest practicable period, without having so studied the whole field of professional science and practice, as to be familiar with all its parts? If he has so studied it, what becomes of the argument or pretence that the field is so extensive that one man cannot keep himself master of the whole? The truth is, that the greater part of medical and surgical practice consists of emergencies. It is not one time in ten, that the physician or surgeon, when he starts to visit a patient for the first time, knows what kind of disease or injury he will find on his arrival. And he can neither satisfy an enlightened conscience nor do justice to a confiding community, unless he is always prepared to meet such emergencies, and treat whatever ills may be presented to him in a skilful and proper manner.

If a man, living in the country, is attacked with iritis or

acute conjunctivo-cornitis, and suffers a permanent disorganization of the textures of the eye, and loss of vision before he can possibly reach a reliable oculist, it is a very unsatisfactory apology for his family physician to allege that diseases of the eye constitute a specialty to which he has given little or no attention. Yet many such cases are constantly occurring throughout the country.

But, gentlemen, there is still another aspect of this subject worthy of a moment's thought. From the very nature of the laws that govern mental operations, exclusive practical attention to any one department of a general subject, tends to contract and bias the mind, by giving undue relative importance to one series of facts, while neglecting another series of equal real value. An evil of much greater magnitude, however, consists in the strong tendency of specialism to encourage incompleteness of professional education. During a connection with medical teaching for sixteen years, I have rarely found a student who, on his final examination, proved himself ignorant of some important department, without alleging that he did not intend to practise that particular department, and consequently had paid less attention to it. Indeed, incompleteness of education leading to the adoption of partial and restricted views, and the universal tendency to neglect whatever is not intended to be turned directly to practical pecuniary advantage, constitutes the foundation of much of the evils that exist in the profession of our country.

You are, doubtless, ready to ask by this time, if I then oppose all specialties in medicine? By no means. There is a certain natural basis on which a limited number of specialties can be founded with great advantage; and which, indeed, develop themselves by the natural and inevitable course of circumstances. For instance, the diseases, deformities and defects of the dental organs, involving no immediate danger to life, and requiring for the treatment of many of them, special mechanical

manipulations, naturally, and almost necessarily, constitute a special department of surgery. A department, indeed, that should be regarded as equal in importance and dignity, and consequently requiring equal education with every other branch of the profession. Those conditions of the eye requiring delicate and dexterous operations are also most of them chronic, and allow the patient time to seek and obtain the services of men who have acquired more than ordinary skill in the performance of such operations. The same is true of those conditions requiring some of the most dangerous and difficult surgical operations upon other parts of the body; such as lithotomy, ovariotomy, tying large and deep-seated arteries for aneurism, etc. Hence it is eminently proper that in all large cities where the required opportunities are afforded, men should devote special attention to such departments. But this never can justify any class of medical men for contenting themselves with only a partial professional education.

Mr. President, with the last clause of the sentiment you have offered, I most cordially agree. That all educated and honorable physicians, surgeons, and dentists should constitute a "common brotherhood," is dictated alike by a community of interest, a similarity of education, and a common object; namely, the alleviation of human suffering and the prolongation of human life.

I am glad to see the prosperity of your Association and its truly national character. Like the American Medical Association, it constitutes a strong social, as well as professional link to bind all parts of our country indissolubly together. And permit me to add, that if the members of the legal and ecclesiastical professions, from the East, West, North and South, would annually commingle with the same cordiality and liberal feeling, it would so perfectly bind the hearts of this great nation, that secession would never again drench our loved land in human blood.

A CODE OF DENTAL ETHICS

FOR THE

AMERICAN DENTAL ASSOCIATION.

BY J. ALLEN, D.D.S.

As a learned profession, the time has come when a more elevated position should be taken and maintained by its members than has heretofore been observed. As one of the means of accomplishing this object, we believe that by adopting for our guide a proper code of dental ethics, defining the position, rank, and duties of the dental profession, important interests to ourselves and to the community at large will be promoted.

1st. As a body, dentists should take a high and honorable position, and do all in their power to maintain it.

Each member should consider himself an integral part of the profession, and endeavor as far as he can to extend its usefulness and sustain its dignity.

A truthful, respectful, and gentlemanly deportment should be strictly observed by each one towards all the other members; and, in our intercourse with others, all remarks designed to reflect discredit upon our profession, as a body, should be carefully avoided. This deportment towards each other would command the respect and admiration of the community at large, and evoke that esteem which a generous public is ever ready to accord to true merit, whether in individuals or organized bodies. But if dentists themselves do not look upon their own profession with deference and respect, how can they expect others to do so?

We hold this matter in our own hands, and can either take a position so high that others will look up to it with commendation, or so low as to be looked down upon with contempt.

With reference to moral rectitude and purity of character, there is, perhaps, no profession in which a higher standard is required of its members than ours, for without these essential requisites a member cannot command the respect and confidence of other dentists, nor of the community in which he lives; for no other attainments can compensate for a want of gentlemanly deportment and correct moral principles. Each member should be strictly temperate in all things, for the dentist requires a clear head, a good eye, a steady hand, an acute perception, and sound judgment. These requisites, together with other commensurate qualifications, constitute the basis for a practitioner of dental surgery. And those who stand upon this platform, and maintain their position, are justly entitled to the confidence, respect, and professional courtesies which are justly their due. Again, there are also those who are young in their pursuits earnestly striving to take their places among this class of dentists, to whom the utmost kindness and respect should be shown by the older members of the profession. This demeanor towards them by their seniors would tend to inspire them with ambition, and strengthen them in their efforts to ascend the hill of science.

2d. Our duties to each other require that in all our social and professional gatherings we should observe strict decorum, and proper respect for each other. And in debate all personalities and sarcastic remarks should be avoided; each speaker should keep in view only the points involved in the discussion, and speak of principles, not of men. We should cultivate a respectful regard for the opinions of others; and in replying to what may have been said in debate, let it be done in a gentle, courteous manner.

3d. Dentists are sometimes dependent upon each other for professional aid; and when such occasions occur, no charge should be made except for the expense incurred.

If, however, an honorarium be offered by an affluent member it should not be declined, especially if the circumstances would seem to justify its acceptance.

4th. A dentist sometimes finds it necessary to request some of his professional brethren to officiate for him temporarily. Compliance with this request is an act of courtesy which should be performed with due regard for the interests and character of the dentist employed. In such cases, pecuniary considerations should be awarded, either by the dentist requiring such service, or by the patient, as the circumstances may dictate.

5th. In consultations, all due respect should be shown the dentist having charge of the case; and no rivalry or jealousy should be indulged. If the case involves obscurity or doubt, no discussion should be held before the patient or his friends; but those in consultation should retire for deliberation, and the result of such consultation should be communicated to the patient by the regular attending dentist.

The consulting dentist should carefully avoid any extra attentions or apparent solicitude, beyond what he is called upon to extend to the patient, lest his manner should have the appearance of artifice or intrigue.

No insinuations should be thrown out, that would tend to prejudice the patient against the dentist in charge, for what may have been done; but the previous course pursued should be justified as far as candor and truth will permit, for it often happens that patients become dissatisfied when there is no cause for it. The want of immediate success, to the extent the patient may have expected, is no evidence of a lack of professional knowledge or skill on the part of the dentist.

6th. With reference to pecuniary considerations for services rendered, there should be some general rules adopted by the State or local societies; and it should be deemed a point of honor to adhere to those rules with as much uniformity as varying circumstances will permit. And it shall be held derogatory to the dignity of a dentist to advertise to do work for half price, or in any way to underrate the value of good operations, for it betrays a spirit of empiricism which should not be tolerated by our profession.

7th. We believe that experience has proven clearly that patents in the dental profession do not advance its best interests, nor the interest of those obtaining them; and that, as a body, we should adopt some other, more acceptable plan for the encouragement of those who are disposed to bring before the profession valuable improvements.

8th. There are certain rules of deportment which dentists should observe toward their patients. They should unite gentleness with firmness, and condescension with decision, in such a manner as to secure the respect and confidence of their patrons. This will command also a like respect from others.

Reasonable indulgence should be granted to patients who are capricious or nervous, and cannot control themselves while in the dental chair. The constitutional diathesis of many persons may be such that weakness and imbecility take the place of strength and firmness of purpose.

9th. Dentists should refrain from speaking of operations they may have performed for the distinguished Mrs. C., the Honorable Mr. D., or the Right Rev. Mr. B., in a boastful manner, for it is unprofessional; and, besides, those persons may feel a delicate sensibility about such matters, and would rather reveal their own personal affairs (if need be), than have others do it for them.

In short, there are many little courtesies and marks of respect due to our patients, which should be observed, and which distinguish the gentleman from the low-bred man.

10th. In return for the honorable discharge of our professional duties to each other, and to those who become the recipients of our best efforts to serve them, we are justly entitled to a due appreciation of dental qualifications from the public, and a proper discrimination between the truly scientific operator and the ignorant pretender; and we will also be entitled to aid and encouragement in building up institutions for dental education; for in this the public are mutually interested with the profession.

There are those to whom these rules will not apply, for they

have no aspirations for eminence, but seem content to be drones; and they take their position outside of the profession, and persistently remain there. This class of men can claim only the respect and consideration due to their rank; for their career is generally derogatory to the character of gentlemen, and the profession proper are not under any fraternal obligations to them.

But those who are accredited members of our profession, will promote its interests, dignity and honor, by adopting as their guide, a well-digested code of ethics.

DENTAL MANIPULATIONS.

BY

J. H. McQUILLEN, M.D., D.D.S.

Every one present, no doubt, can recall the pleasure he has derived in observing the facility and precision with which some skilled hand performed, promptly and without hesitation, the most difficult, varied, and delicate manipulations in music, in art, or in mechanics; no misses, no false strokes, but each effort exact and perfect, and the proper sequence to that which preceded it. And on the other hand, can remember instances in which he has experienced a feeling of discomfort, almost amounting to misery, as he noticed the unsuccessful efforts of some poor fellow, whose fingers, to employ a popular and expressive term, were all thumbs; and who apparently never was intended by nature to be employed in such direction.

If the mere sight of this diversity of manipulation on inanimate things induce such opposite feelings, what must be the difference, in the sensations experienced by patients when under the hands of a careful and skilful practitioner, or submitting to the rude efforts of one whose awkwardness keeps them in constant dread lest the slipping of an instrument may inflict serious and irreparable injury!

There is a right and a wrong way of doing everything, whether it be the preservation of a tooth, the ligation of an artery, the construction of a watch, or the building of a steam-engine. And the possession or absence of skill on the part of a workman will be fully demonstrated when engaged in any of these directions. Indeed, to a keen observer, in the mere act

of peeling an orange, the difference between an artist and a bungler is discernible.

It may very properly be asked, to what is this marked difference due? Is it owing to the fact that natural gifts are granted to some and denied to others; or is it largely due to education? That natural endowments have much to do with the matter, particularly in the case of those who evince the highest order of skill, is unquestionable; but that education or *drill* has far more to do with it in all cases, is equally undeniable. Some one has quaintly said, "that the reason why nature is so perfect in her art, and gets up such inconceivably fine sunsets, is, that she has learned how at last, by dint of doing the same thing so often."

Here is the secret of the excellence which characterizes the efforts of the few, in contradistinction to the failures of many, viz: doing over and again any given work with the fixed determination to improve on each succeeding effort; back of this, in addition, will be found a concentration of purpose which nothing can divert, an indomitable will which no obstacle can intimidate, and an ideal of excellence, which possibly never may be reached, but that carries its possessor further than he would otherwise have gone without it, and far beyond those who have no such incentive to action. Efforts of this kind, to be sustained and constant, demand an amount of vital force, which is either not generally distributed, or is latent in the many; and, as it is the fate of every undertaking to be endangered by miscarriages and success, by confidence and despondence, those who engage in an enterprise with a false estimate of the difficulties to be encountered in the accomplishment, are apt to be discouraged by slight obstacles, and after a few abortive efforts, to secure and maintain an elevated standard, content themselves with results which neither benefit others nor reflect credit on themselves. In addition to this, weariness and negligence are constantly prevailing by silent encroachments, in bringing about the same results.

In applying these general principles to our own specialty, it will be generally admitted that in no vocation are the duties more varied or call for the exercise of a higher order of skill, and that mechanical dexterity is necessarily a matter of the first importance to the dentist, and that he should diligently endeavor to acquire the art of using his instruments with neatness, certainty and rapidity; for much of the success of an operator and the comfort of his patients depend upon the manner in which his work is done. But mere manual dexterity must not be mistaken for professional skill; and desirable as it is to perform an operation as quickly, and as easily as possible, it is still of far greater moment that the operations should be well and thoroughly done.

It is important, therefore, first to learn to do any given work *well*, and as quickly as possible afterward, being sure, however, in the latter, that every effort is put forth to produce a perfect result, let it cost what it may of time and patience. The manly part is to do with might and main whatever one attempts to do; and it is the privilege of any work which is well done, to invest its doer with a certain quiet consciousness of the ability to do the like again. It is the possession of this, which constitutes the desirable self-reliance of the experienced practitioner. And it should be the aim of all to earn, by the repeated efforts, the right to possess such an inestimable quality.

If there is one point more than another of which patients have just reason to complain, it is the unnecessary discomfort and pain to which they are often subjected by the dentist in the performance of his professional duties.

Dental operations, under the most favorable circumstances, can never be regarded as pleasant, and it should be remembered that a patient in the operating chair is not a mere lump of inanimate clay, but a highly sensitive and impressible being, keenly alive to the difference between rough and gentle handling. The operations about the mouth indeed demand the greatest delicacy

of touch and the most skilful manipulation, and yet it is no unusual thing for patients to complain in unmeasured terms of the rude manner in which their mouths have been stretched from ear to ear, or the awkward way in which the instruments had been handled, slipping over and again, lacerating the gum, passing through the lip or cheek, or crushing the tooth operated on. The slipping of an instrument is liable to occur to any one, particularly when operating for a restless and unmanageable patient, who shrinks from or starts forward at the slightest touch; but when it does happen to the careful operator, his guards against such accidents are so well maintained, that no serious injury can possibly be inflicted.

It does not necessarily follow, because one is slow in learning the use of instruments, or handles them awkwardly in the beginning, that of necessity it will be impossible for him to acquire dexterity and skill in their management. Many, who have been regarded as incapables by their preceptors, have, by dint of patient, dogged determination and constant practice, acquired skill of no mean order. To one who possesses a fair amount of intelligence and an ardent desire to excel, it is only necessary to emulate the constancy of a young miss, who devotes six hours per day merely to acquire the proper poise of the hands for playing on the piano, and much of the difficulty will be removed.

A *clear head*, a *keen eye*, and a *firm* and *steady hand* are indispensable qualities on the part of an operator, and he who lacks any of these will not be likely to produce results of a very high order.

By a clear head I mean the capability of dismissing from the mind every subject but that which claims attention at the time, in this way affecting a concentration of thought and effort in the given direction; for concentration is one of the secrets of strength or power in the management of all human affairs. The student who engages in his studies with a divided attention cannot acquire knowledge as quickly or as thoroughly as one

whose mind is completely absorbed by it, and, when an occasion arises for its employment, will find that he has the most vague and indefinite remembrance to fall back on. Those who have been most successful in science, in art, or mechanics, if questioned, will acknowledge that the secret of their power and success has been concentration of purpose, and that things go not by luck, but by law.

In addition to the faculty of concentration, transition of thought, or the power of turning the attention quickly and fully to different subjects, is absolutely demanded on account of the diversified claims made upon the dental practitioner by his patients; and the man who has that presence of mind which can recall on the instant all he knows, is worth, for action, a dozen men who know as much, but can only bring it to light slowly. While the versatility of talent which enables one to pass quickly from one thing to another, is greatly due to temperament, yet it is, in a marked degree, susceptible of cultivation on the part of all.

Keenness of vision is a matter of the first importance to the operator, for without that, his views in relation to intricate cases must be vague and unreliable, leading him constantly astray, and when engaged in the performance of operations inducing frequent slipping of instruments. Called as he is to decide upon points calculated to test in the most marked manner, his visual powers, and compelled to tax them to their utmost limit in prolonged and difficult operations, it becomes a matter of moment to consider how they may be improved and preserved. To secure directness of vision, or the ability to look fixedly at an object demanding attention, no better course can possibly be adopted than that of shooting at a mark. This plan is not only calculated to improve, but to preserve vision; for nothing is more trying than the fixed and constant gaze on near and small objects demanded in the performance of dental operations, and it is not only a great relief but a benefit to the eyes, to rest them by looking at distant objects.

With regard to a firm and steady hand, the operations on the teeth do not call so much for an immense outlay of strength on the part of the operator, as a judicious employment of the force resident in a fairly-developed, firm and steady arm and hand. There is no exercise better adapted to give strength, firmness and flexibility than fencing; and, the quickness of eye which is called into play under such circumstances, is of advantage to that organ. Engaging, indeed, in the entire round of gymnastic training, speaking from personal experience of many years, might, with great propriety, be advised. For the physical acts on the moral nature, and the strength, agility, suppleness and quickness of movement gained for the former, impart to the gymnast the self-reliance and perseverance which belong to the latter. The senses and intellect are strengthened at the same time by the habit of measuring with the eye the relative distances, and the height and size of the objects which are met with in running, jumping and climbing. With quickness of perception thus gained, are associated precision, promptness, and finish, which can, with great advantage, be brought into play in the practice of dentistry.

Delicacy of touch, in addition, should be assiduously cultivated as a means of diagnosis, for it must ever be a source of great comfort to a patient to come under the hands of an operator who can determine that a pulp is exposed without plunging a probe into it, or decide on a case of periodontitis without striking on the tooth as with a sledge-hammer, or perceive immediately, with a slight touch of the finger, the fluctuation due to the presence of pus in an abscess.

One thus careful, when engaged in making an examination, or operating on the mouth, in place of passing in the index-finger, bent and used as a hook, and then stretching the commissure back to the ear, carries it into the mouth up to the first phalangie, and then merely presses the cheek outward with the finger, obtaining in this way not only sufficient light for examinations, but

room for operating; a slight rotation of the lower jaw, to the right or left side, as the case may demand, contributes still more to lessen the discomfort of the patient, and to increase the room for the operator to work in.

Again, when examining a patient whose face is so much swollen from an alveolar abscess that it is impossible to separate the jaws, instead of clumsily attempting to force the index or middle finger into the mouth, the *little* finger can be introduced with ease, and carried about in every direction, without increasing the discomfort or pain of the patient, and yet at the same time affording the most valuable and reliable information.

To prevent the slipping of instruments, or the infliction of serious injury when it does occur, guards against such accidents should be invariably maintained. Thus, when employing a great amount of force, if the arm of the operator is kept firmly pressed against his side, even though the hand slips, its progress is arrested by the immovable position of the arm; again, by resting the thumb or any of the fingers of the hand employed, on some tooth or the parts in the neighborhood of the one operated on, the instrument is not likely to slip, and if it does, cannot go far astray, or do much injury. In addition to this the opposite hand, either protected or not by a napkin, should be used as a shield, securing the surrounding soft parts of the patient. A careful operator would prefer that an instrument should pass into his own person rather than that of his patient.

A chair, alongside of which an operator can stand straight up to his work, is preferable to one over which he would be constantly compelled to stoop. The fatigue, pain in the back, and deformity of person attendant upon the use of the latter, are all sufficient arguments against its employment. The habit with some practitioners, when operating, of allowing the weight of the body to press on one foot, in place of planting themselves firmly on both feet, is decidedly objectionable on

account of the deformity likely to ensue under such circumstances.

Operators, apparently without recognizing the fact, frequently place themselves in positions which intercept the light that should pass into and illuminate the mouth of the patient; the head of the operator, for instance, is frequently brought so close to, and in such a position, that of necessity a shadow is cast by it, which renders the oral cavity and its contents dark and indistinct. By elevating or depressing his head this can be obviated, and a fair view of the cavity obtained; again, by turning the head of the patient to the right or the left side, all the advantage of illumination, and a view of the cavity required can be gained without subjecting him to the annoyance attendant upon having the head stretched back far beyond the perpendicular of the body.

With regard to instruments, it is important of course, that they should be properly constructed, keen edged, and well tempered, for much of the success in manipulation depends on attention to these points. While no objection can be urged against the possession of any number and variety of instruments, care should be exercised not to have more on the tray than occasion demands, for when it becomes crowded with instruments, the operator frequently loses much valuable time in turning them over and over, in search of the one desired. If this is frequently repeated, the time and patience of operator and patient are apt to become exhausted, and the latter may come to the conclusion that the former is not very well acquainted with his profession.

The proper way to commence each day's work is to place on the tray, in the morning, such instruments as are likely to be demanded, and then to prevent the undue accumulation likely to ensue from successive operations by putting others away as soon as the occasion for their use has passed.

REPORT

OF THE

COMMITTEE ON MECHANICAL DENTISTRY.

BY J. ALLEN, D.D.S., *Chairman.*

Your Committee beg leave to submit the following report:

At the very threshold of this subject, however, we meet with a difficulty in determining the exact limits within which to confine our remarks, for we have no terms in our dental vocabulary which express clearly what constitutes mechanical dentistry.

Therefore different constructions are given to these words.

One says the filling of a tooth is a mechanical operation, and that he who does it, simply performs the work of a mechanical dentist.

Another says, the cleaning and removal of caries from the natural teeth with an instrument, is strictly mechanical. But Dr. B. says, No, these operations come within my specialty, and I am not a mechanical dentist. They who insert artificial teeth, are entitled to that appellation.

No, says another, I construct artificial dentures; and it requires the skill of an artist, more than that of a mechanic to form and adapt them properly to the mouth of a patient. Lexicographers tells us that a mechanic is a person whose occupation is to construct machines or goods, wares, instruments, furniture and the like, according to certain fixed rules or laws. Does the dentist who constructs and inserts artificial dentures, come under this head? Has he fixed rules and laws by which he can produce the desired results, in every instance?

No, he has no two cases alike, consequently, no fixed rules can be applied; he must vary every piece he makes according to the requirements of each particular case. And if he has acute perception, he will discover as much difference in them as does the artist in the various faces he portrays upon canvas.

Therefore, each case, involves an original design, which is conceived in the mind of the dentist; and the result, depends upon the clearness of his conception, and in the execution of his purpose.

To prefix the word "mechanical" to dentistry, does not seem to define clearly what is meant, for it refers to a calling below the summit attained by the scientific dentist.

Some of our profession prefer to prefix the word "artistic" in place of "mechanical," but this does not express just the idea, although it may be a closer approximation than the former term.

Our lexicons tell us that an artist is one who professes and practises one of the liberal arts, in which science and taste preside over the manual execution.

And that the mechanic arts or trades, are those in which the hands and body are more concerned than the mind.

Now the question is, which has the preponderance over the other, in the construction of artificial dentures, the mental or the physical powers of the dentist.

In solving this question we must look at the different mechanical and mental points involved. (We use the word points, for want of a better term.)

First, in forming, for instance an upper denture, seven mechanical points are involved, viz: the impression, the model, the dies, the swaging, the grinding and attaching the teeth upon the plate and adjusting the same to the mouth. And there may be some men who go no further than this. But the well qualified dentist finds eight more points strictly artistic, which are also involved. First, the physiognomy or general character of

the teeth, which should be in harmony with the other features of the face.

This requires judgment, taste and accuracy in the length, size, form, tone and position of the teeth, and also the proper quantity and shade of the gums, together with the natural form and appearance of the roof and rugæ of the mouth, and in many cases, the restoration of the form or contour of the face.

In view of the combination of these fifteen points, or counts (to use a law term), where the head conceives and the fingers execute, it would seem to require a compound word derived from mechanical and artistic, to express the idea intended to be conveyed by the terms "mechanical dentistry." But we have as yet, no such word.

So rapid has been the advance of dental science, that lexicographers have failed to keep up with it; and hence our confusion.

For example: Walker says, a dentist, is a surgeon, who confines his practice to the teeth; no intimation is given that any portion of his range of practice, lies beyond these organs. Webster says, a dentist is one whose occupation is to clean and extract teeth, or repair them when diseased, and, according to his estimation, he might have added or shave his patients.

With all due deference and respect for these eminent men, we can hardly restrain the idea, that so far as dentistry is concerned, they know but little about it. If these definitions embraced all of dentistry at the time they wrote, we can see the advance that has been made from that time to the present.

If the great labyrinth of dental science could be brought in full view before them now, perhaps, they would give us some clearer definitions, or help us to coin such terms as we need for our own use. But until we have some better terms we should prefer the words "artificial dentistry," instead of "mechanical dentistry."

But to confine our remarks to the present general acceptation

of the term "mechanical industry," we find that no important improvements involving new principles, have been developed since your last meeting, at which time we presented a short review of the various materials that have been employed as bases for artificial teeth.

They consist of bone, ivory, the tusks of the hippopotamus and walrus, tortoise shell, horn, silver, gold, platinum, palladium, aluminum, tin, rubber, gutta percha, and also metallic and silicious compounds, with various modifications.

The principal substances now in use in this country for this purpose are gold, silver, platinum, vulcanized rubber and gutta percha, and also a compound of metals called cheoplasty.

The vulcanite bases are now used perhaps to a greater extent than any other. The advantages they possess are these: they are easily constructed, a good fit to the mouth can be obtained, and the cost is much less than for gold or platinum. It is also claimed by some that owing to their lightness they are preferable to metallic plates. This claim, however, is disputed by others, especially as regards lower sets, as they are more easily buoyed up, and kept afloat in the mouth; and, as to an *upper* denture, a few pennyweights, more or less, make no practical difference in the result; for, if a plate fits the mouth properly, it is sustained by atmospheric pressure, which would require several pounds to displace it, except by tripping or undue pressure at some given point. This style of work fills a niche which enables the poorer classes to obtain artificial teeth at little cost. This is well. But in adopting this method we should not neglect to cultivate and perpetuate those higher styles of work upon metallic plates which have been and should continue to be the pride and ambition of every dental practitioner. For while there is an evident advance in the operative branch of our profession, the artificial department should be also carried forward with equal energy and skill.

There is a group of metals of comparatively recent discov-

ery, some of which, we think, will prove to be a great acquisition to this branch of dental practice, when they shall have become better known.

We will here simply refer to these metals and their properties with a view of eliciting scientific researches and experiments in this direction. These metals are called Iridium, Rhodium, Ruthenium, Osmium and Platinum. With the last named you are all familiar.

In point of purity, malleability, and ductility this metal, you know, compares favorably with gold, and is unaffected by any furnace heat. But, unalloyed, it is too soft for any ordinary plate work, unless stiffened or strengthened by other means, as in continuous gum work.

But when alloyed with some of these metals which are equally pure, and in combination stand the heat of the furnace as well, it can be made as hard and as elastic as may be desired for partial pieces or clasps, and what is still better and particularly desirable is, that a very strong furnace heat does not soften or impair its elasticity.

A very small quantity of Iridium or Rhodium combined with Platinum is sufficient to produce the requisite stiffness for dental purposes.

Iridium and Osmium form the hardest alloy known, being as hard as quartz. It is very infusible and is now being used for pointing gold pens. Osmium is of a bluish-white color, but not so white as Iridium. Rhodium is of a reddish-white color, and resembles Iridium in point of hardness and in resisting the action of acids and heat.

Ruthenium is very much like Iridium in all its leading characteristics. Now we have in this family cluster of metals all the properties that can be desired in bases for artificial dentures, and it now remains for the dentists to take these substances which an all-wise Providence has provided for us, and convert them into practical use in our profession.

Through the kindness of our mutual friend, S. S. White, who is ever ready to do all in his power to supply the wants of the profession, we have been furnished with some samples of these metals, and the results of our experiments with them have been highly satisfactory, having used them for whole and partial plates, clasps, etc.

With reference to gold-plate work we have nothing new to offer. We do not, however, see as much beautiful work of this description of late as formerly. Nor has there been any special improvement in either of the lower styles of artificial dentistry since your last meeting.

Improvements have been made in some of the implements used in manipulating rubber work, by different members of our profession, which not only facilitate the execution of the work but also renders it more perfect when completed.

This is another evidence of the capacity and resources we have within ourselves to meet the wants that may arise from the development of any new principle connected with dental science.

With reference to continuous gum work, it is believed by those most familiar with its use, that it will maintain a prominent position in our profession, especially when employed for full sets or large pieces. Your Committee would further state, however, that no one method is preferable to all others, in all cases; but, that the dentist should adopt that style of work which the varying circumstances of each particular case may seem to require.

REPORT OF COMMITTEE

ON

DENTAL EDUCATION.

BY JAMES TAYLOR, D.D.S., *Chairman.*

Read by L. D. Shepard, D.D.S.

The Committee on Dental Education beg leave to submit the following:

We see a yearly increasing attention to this subject on the part of the profession. Our dental associations have done much to awaken an interest on this subject. Perhaps we have failed to duly appreciate the educational advantages thus obtained. The peculiar condition of our profession, just in its developmental stage, needed more than anything else the bringing of the profession together, that views might be compared, that different modes of practice might be critically examined, the results looked at, and the most efficient adopted.

It is not too much to say that every meeting of the profession, in an associated capacity, has been a mighty power, dispelling ignorance, removing prejudice and helping on the great work of general enlightenment. Through this instrumentality individual want has been made apparent, and often remedied. We must know our deficiencies before we can remedy them. Mind brought to act on mind stimulates to action; new thoughts are evolved, and thus a higher and more elevated stand-point for observation is obtained; every member of the profession is benefited, the most wise as well as the most ignorant, and often

the former more than the latter. We regard, therefore, every local, State, and national association as a kind of school for the benefit of advanced pupils. Those who have passed through the primary department come here to graduate; and if they use well their time, will get their degree when they have passed through this their last *alma mater*.

We take it for granted that all come up to these gatherings of the profession to learn something. We are satisfied that none need go away without having obtained it. Taking this view of dental association, we report with great satisfaction the continued progress which is being made in the organization of dental societies throughout the Eastern and Western States. The character and efficiency of these organizations are, we believe, much enhanced by our national organization. We trust that this state of things may continue and progress until a code of ethics shall be established and lived up to, which shall command the respect and admiration of every medical man. Then dental education must result in an *esprit de corps* that will be alike honorable and advantageous to the profession. We shall not take the time of the Association in tracing out the rise and progress of our dental societies, yet we felt that so important is this instrumentality in dental progress that it could not be overlooked in a report on dental education.

The Committee would especially call the attention of the Association to that education which is usually given to those who are making preparations for the practice of Dental Surgery. For conciseness and brevity we divide the subject into office and collegiate instruction.

First, Office Instruction. In this particular we feel there is sad neglect; not that students are not often taken and also put into the laboratory to master the details of the mechanical department. But those who take students should feel that something else is also necessary; that books are to be furnished the student, a course of study laid down and enforced; that two or

three old and almost obsolete works on practice cannot prepare the student for the duties before him.

We feel the profession has now arrived at a stand-point where a thorough reformation in dental instruction is needed, and in no respect so much as in this. The *curriculum* of study has been enlarging from year to year, yet not more than the pressing needs of the case and the united voice of the profession demand; but where is the effort in our offices to meet this? Is it not fair to assume that we owe the profession some duty? that those who have mastered the difficulties of early practice and are now reaping the rewards of their persevering toil from a grateful public, should feel that the accumulating demand for skilled operators cannot be met without their aid? We are satisfied there are not enough good dentists, not as many good students as the public wants demand; that the profession at large is far behind their duty in the selection of that class of young men as students who will adorn and elevate our profession.

The impression is a very common one, and we believe has been cultivated by many dental practitioners, that the great desideratum which is most needed in the dental student is mechanical tact, so called. This mechanical tact dispenses with every other qualification, and if it has passed a few weeks in the shop of a silversmith, it is, *par excellence*, the *thing* out of which to mould a dentist. The Committee, however, would not even seem to discredit so important a gift when properly controlled, but would especially urge that this shall not set aside all other qualifications so much needed, and particularly that thorough primary education, without which no student should be taken. Along with mechanical tact or genius, if you see proper to exalt the qualification, should be at least coupled the capability of reading and spelling correctly, and indeed the art of writing, and the ability of constructing a grammatical sentence should also be added. Less than this your Committee cannot

recommend; far more they would plead for and urge, contending that it is in the power of the profession to make it rank with the most cultivated of all the professions, so that every member shall be a scholar and scientific operator. We are gratified to know that there has been much progress in the right direction, yet we feel it important to draw attention to that preparatory course of study which we regard as necessary for every dental student, hoping the profession will all feel that it is a matter in which they are personally interested.

A code of ethics, requiring a high grade of scholarship for every student, would be a blessing to the profession.

We come now to speak, secondly, of Collegiate Instruction. We believe it to be an established fact, that dental colleges are a necessity; perhaps no member of the profession would say that they have not been a benefit.

Some of our older practitioners can remember when the medical profession was passing through the same ordeal with their colleges, as we are now with ours — in one thing our history must be a repetition of theirs — which is, that, soon every student will feel that before he assumes the duties of his profession, he must pass through the entire course of study, and get his degree; the honor and reputation of the profession will soon demand this: let us, therefore, see that our institutions are what they should be — that they can be thus made, and that they are fully coming up to the demands of the profession and times, it is only necessary to draw attention to the gradual enlargement of their curriculum of study.

The Baltimore College of Dental Surgery was organized in 1839, and their course of instruction embraced the following studies: Principles and Practice of Dental Surgery, Special Pathology and Therapeutics, Anatomy and Physiology, Operative and Mechanical Dentistry. In 1846 the same course of study was still pursued, embracing a Demonstrator of Mechanical Dentistry.

In 1846, the Ohio College of Dental Surgery, opened with only three chairs, but the course of instruction was the same as that in the Baltimore School, with the addition of Lectures on Dental Pharmacy. These appeared to be so important to the student and dental practitioner, that the next winter a regular course of lectures on Chemistry was secured, since which time, all the dental schools have embraced Chemistry, and indeed Metallurgy, as part of their course of instruction.

If time permitted, a brief history from year to year, of all our dental institutions would be interesting, showing the gradual development of dental science, as well as the progress which has been made to meet the rapid improvement in every department of the profession. But our object is not to give a history of these institutions, but to show that they are worthy the encouragement and support of every member of the profession.

We have now five dental colleges; one in Baltimore, one in Cincinnati, two in Philadelphia, and one in New York. We regard not the number as too large, but hope to see them all more liberally sustained. They embrace, we believe, a large amount of working talent, which if properly directed and co-operative must result in great good.

There is one error in regard to the time after the commencement of study, when students should attend the first course of lectures. The general opinion appears to be, that a year or more should be first spent in an office. We are however satisfied that a large majority of students should enter college as soon as possible. Very few students have any proper conception of the amount of study before them, until they attend their first course of lectures. Many, very many, enter college after having been in practice and passed through their office instruction, eager to acquire more insight into mechanical or operative dentistry; discontented perhaps at first, because their whole time is not given in these channels, yet soon find they are more deficient in general principles, and that these must first be

obtained to make the other truly available. Far better that young men should start out with a proper knowledge of what is before them. If they have not the courage to meet this, the sooner they abandon it the better; the profession will be rid of one drone.

We have always noticed that students study better, and are more ambitious to excel after their first course of lectures. We do not say that students might not be advanced by private instruction, so that they would be better prepared for college, but that, as a general rule, this is not the case. But few, perhaps, of our successful dental operators, have much time to devote to students; and unless they should devote their whole time, they could not impart as much instruction as a corps of teachers. We doubt not, that, with our present college organizations, with their lectures and demonstrations, their specimens and illustrations, and their systemized study, more can be accomplished for the advancement of the students in one course of sixteen weeks, than private offices can accomplish in a year. We say this not in derogation of office instruction, but as the conviction of much close observation; this is the result of observation, too, in connection with collegiate instruction under all the adverse circumstances which usually attend the introduction of new enterprises. We believe that our colleges, having passed through their struggle for existence, and also learned much as it regards the best method of teaching, are now in a far more efficient state of organization than ever before.

The resolution passed at our last meeting, on dental education, meets with our hearty approval, and embraces a course or term of office instruction in no case too long; and collegiate instruction the same.

The Committee feel that they have not, in their report, covered near all the ground which they might; they have aimed, however, to make this report more suggestive than historical, hoping thus to bring the present condition of dental education

before the Association in that manner which shall secure a full and candid discussion.

We cannot, however, close our report without alluding to one other means of education, which is the press. Through it we have monthly lectures on art and science, criticisms and discussions on everything appertaining to the profession. We are glad to report the press in good condition, having almost killed the old monster Quackery. They pursue the even tenor of their way with far more dignity, and hardly deign to notice the old carcass. But the press, we let it speak for itself.

HARD RUBBER OR VULCANITE.

BY

E. WILDMAN, M.D., D.D.S.

Read by T. L. Buckingham, D.D.S.

As hard rubber or vulcanite is now so generally used as a base for artificial dentures, I am induced to offer a few remarks upon its composition, and give the results of some of my experiments, analytical and synthetical, for the benefit and information of the profession.

The manufacturers of this compound are so reticent as to its composition, that little information can be obtained as to its ingredients, except from the specifications of their patents and from experiments. Nelson Goodyear in the specification of his patent for making hard rubber, dated May 6, 1851, says the best proportions of caoutchouc and sulphur are about equal parts, but a better result will be produced by the introduction of magnesia or lime simply, or their carbonates or sulphates; he recommends the following proportions:

Caoutchouc	1 lb.
Sulphur	½ lb.
Magnesia, or lime, or carbonate or sulphate of Magnesia, or carbonate or sulphate of lime, or French chalk or other magnesian earth .	½ lb.

These proportions may be considerably varied without materially changing the result, but in no case is it desirable to use a much less quantity of sulphur than four ounces to every pound of caoutchouc.

With either of the above compounds, gum shellac may be combined to great advantage, say in proportion of from four to eight ounces of shellac to every pound of caoutchouc. Resin, oxides, or salts of lead or zinc, of all colors and other similar substances, both mineral and vegetable, may be added in small quantities to either of the compounds for the purpose of imparting a polish or a suitable color thereto, and for making the mixture work more easily.

In the specification of the patent of Charles Goodyear, Jr., for improvement in plates for artificial teeth, dated March 4, 1855, he says, "The best compound, I believe to be one pound of India-rubber, or gutta-percha, or the two combined in suitable proportions with half a pound of sulphur, with a suitable quantity of coloring matter. To obtain a suitable color, I mix with the caoutchouc or gutta-percha, vermilion oxides of iron or zinc, or any coloring substance that will stand the necessary degree of heat with the action of sulphur."

Another specification I shall refer to, is for an "*improvement in preparing caoutchouc, adapted specially for dental purposes*," dated March 20, 1861. (English.)

"For the purpose of this invention," says the patentee, "I treat the red rubber of commerce in the following manner:

"First. I soften the red caoutchouc by dissolving it in sulphuret of carbon, ether, chloroform, or other solvent; and, according to the degree of solution to be obtained, the caoutchouc must be dissolved in a quantity of the solvent varying from one quarter of the weight up to an equivalent weight of the caoutchouc.

"Second. I introduce into the solution one of the following substances: *sulphate of barytes of manganese, of strontian, of antimony, calcined alumina, calcined or precipitated silex, phosphate of lime, or carbonate of baryta.* These agents are used alone or mixed with *oxide of zinc.* The object of their introduction is to reduce or tone down the red in the caoutchouc, and to cause

it to assume a flesh tint; sometimes a little carmine is added. The decoloring agent is introduced in about equal quantities, by weight to that of the red caoutchouc.

"The product obtained by the treatment, is in the form of a flesh-colored paste, of a consistency suitable for moulding of dental pieces. When the paste is required to be more supple, a small quantity of ordinary caoutchouc in solution may be added."

He further adds, this composition vulcanizes in much less time than ordinary red rubber, and to develop the flesh tint it is necessary to expose it to the rays of the sun in an alcoholic bath.

These two latter specifications contain all the information published, that I have met with, relative to rubber compound for dental purposes; and, to throw more light upon this subject, I have instituted a series of experiments, to obtain a better knowledge of the value of the different compounds vended for the use of dentists.

FOR FIXED MATTER.

In testing for the quantity of fixed matter, my attention was first directed to a dark-pink rubber by its great specific gravity, 2.188; this led me to believe it to be loaded with foreign matter. Whose make it was I do not know.

First. One hundred grains of this rubber was brought to a white heat to expel all volatile and combustible matter; it did not produce much volume of flame, and left a white ash, weighing *sixty grains*; taking into consideration the sulphur and vermilion which were volatilized, it would leave but a small percentage of caoutchouc in the composition.

Second. Two specimens of English light-pink rubber obtained from different sources. In the fire they gave out considerable volume of smoke and flame, and each left a residue of *forty-eight per cent* of white ash.

Third. A specimen of English pink rubber, made by Ash & Sons, London, marked No. 1, acted similar to the preceding, in the fire. This left a residue of *forty-eight per cent*, of a yellowish-white earthy matter. The ash retained the original shape of the rubber.

Fourth. Ash & Sons' pink rubber marked No. 1, X, acted similar to the two preceding, in the fire. It left a residue of *forty-seven per cent.* This was principally, if not wholly white oxide of zinc.

Fifth. Specimen of Ash & Sons' rubber, marked S. P., treated one hundred grains. Under the action of the heat it first melted down like pure caoutchouc, then emitted a copious volume of smoke and flame. Left a residue of a whitish color, weighing *twenty grains;* this appeared to be principally white oxide of zinc.

Sixth. Specimen of Ash & Sons black rubber, (properly brown.) One hundred grains of this was treated as the preceding. Its action in the fire was similar to pure caoutchouc, first melting down and then emitting a dense volume of smoke and a bright flame. Residue a dark and white ash weighing *four grains.*

Seventh. English red rubber. This left *six per cent* of dark ash or cinder.

Eighth. Dieffenbach's red rubber. Left a dark ash or cinder of *sixteen per cent.*

Ninth. Red rubber. Maker's name not known. This was treated as above. It melted down, then boiled and foamed, giving off a dense volume of smoke, with a strong smell of asphaltum, leaving *four per cent* of dark ash. Although this rubber left so small a quantity of fixed matter, it is evidently of a very inferior quality, and is largely adulterated with asphaltum, or some similar inferior substance. I have been informed that it works badly.

Tenth. American Hard Rubber Company's red rubber.

This produced a copious flame and a dense black smoke, and acted much like pure caoutchouc, while the volatile portions were being given off. *Residue. Five per cent* of a dark ash or cinder.

Eleventh. American Hard Rubber Company's white rubber, This did not yield a dense smoke or much flame in comparison to unmixed caoutchouc. Left a residue of *fifty-one per cent.* which was white, compact, and appeared to be a fine quality of white oxide of zinc.

Twelfth. American Hard Rubber Company's brown, for dental purposes. This gave off a dense smoke and copious flame, first melting down like pure caoutchouc, leaving *near four per cent* of dark ash.

Thirteenth. Specimen of my own make of brown rubber, composed of

Para Caoutchouc	2 parts.
Sulphur	1 part.

Under the action of the heat, this acted precisely similar to the last preceding, (12) and yielded *near three per cent* of a dark ash.

Fourteenth. My own make of red rubber. Composed of

Para Caoutchouc	48 parts.
Sulphur	24 "
Vermilion	36 "

In the fire it acted similar to pure caoutchouc. One hundred grains left an ash-colored residue of *two per cent.*

Fifteenth. Ash & Sons' white rubber. This acted similar to No. 11. Left a residue of *fifty-one per cent* of white oxide of zinc.

TABLE SHOWING THE RESULTS OF THE PRECEDING EXPERIMENTS.

		Per cent of fixed matter.	
1	Specimen of Deep Pink	60	
2	English Pink	48	white clay.
3	Ash & Sons' Pale Pink, No. 1. . . .	48	
4	" " Deep Pink, No. 1, X . .	47	ox. zn.
5	" " S. P.	20	" "
6	" " Black (brown) . . .	4	dark ash.
7	" " White	51	white ox. zn.
8	English Red	6	dark ash.
9	Diffenbach's Red	16	" "
10	Red, unknown (Asphaltum) . . .	4	" "
11	American Hard Rubber Company's Red .	5	" "
12	" " " " White .	51	white ox. zn.
13	" " " " Brown, near	4	dark ash.
14	My own Brown (c. 2, s. 1), . . . near	3	" "
15	" " Red (c. 48, s. 24, v. 36) . .	2	" "

These experiments show us that the pink and light rubbers for dental purposes, are heavily loaded with such foreign matter as white clay and oxide of zinc, and some to the extent of fifty-one per cent of their weight. Ash & Sons' S. P. is decidedly the best of his light rubbers, containing only twenty per cent of fixed matter.

Again, Ash & Sons' black (brown), the American hard Rubber Company's brown, and my own brown, give results, respectively, four, near four, and near three per cent of fixed matter. My own I know was made of pure Para caoutchouc and of sulphur; hence, from the residues of the two former so nearly approximating thereto, and also from their similarity of texture and appearance before and after being vulcanized, we must arrive at the conclusion they are of the same composition, and are therefore good and reliable brown rubbers.

When we examine the results of the experiments upon the American Hard Rubber Company's red, the English deep red,

and my own red, we find the fixed matter to be *five*, *six* and *two* per cent respectively. My own red was made of pure Para caoutchouc, vermilion and sulphur. The small disparity of fixed matter found in these rubbers may have arisen from the different state of purity of the caoutchouc used in compounding them.

It is evident that the specimens of the American Hard Rubber Company's red, and of the English red, were not loaded with earthy matter, or oxides of zinc or lead; for, if they were, the earthy matter would have given us a greater percentage of fixed matter. Oxide of zinc is fixed in the fire at a white heat, and, if present, would have produced a similar result. Oxide of lead would have shown itself by its reduction and the greater weight of residue.

The conclusion we would naturally arrive at from the results of these experiments is, that the American Hard Rubber Company's red and the English deep red, are the best red rubbers now offered for dental purposes.

The American Hard Rubber Company's red was first tested in January 1864, and the same test was repeated with this make of rubber in the market in January 1865, with precisely the same results, showing a uniformity in the composition.

To ascertain if there was any free mercury in the American Hard Rubber Company's red rubber as has been asserted, or any evolved by the decomposition of the sulphide during vulcanization, a bulb was blown at the end of a glass tube; into this red rubber was introduced, the tube was then bent above the bulb in the form of a retort, and the open end drawn out upwards to a capillary point. The bulb containing the rubber was immersed in a bath of paraffine and vulcanized for one hour and a quarter at 320° F. — during which time the opposite end was kept cold, to condense the mercury if any should come over. The result of this, and several similar

experiments was, no trace of mercury could be detected; free sulphur was sublimed and condensed in a small quantity in the cold parts of the tube.

To ascertain if sulphide of hydrogen is given off during vulcanization, a bulb was blown at the end of a glass tube, this was filled with red rubber, the tube was then drawn out very small from immediately above the bulb, and curved so that the small end, when the bulb was in the paraffine bath, could be inserted into a vessel beside it.

The bulb was then placed in a paraffine bath, and the tube inserted into a vessel containing a solution of acetate of lead. The heat was raised to 320° F., and retained at this point for one hour and a quarter.

The mean results of several experiments, conducted in this manner was, that during the first thirty or forty minutes after the heat had attained to 320° F., bubbles of sulphide of hydrogen came over at short intervals, and at the expiration of this time, it was evolved in a continuous stream, which continued for a few minutes, causing a copious precipitate of sulphide of lead. After this, until the expiration of the hour and a quarter, the gas was given off sparingly at intervals.

This experiment gives us ocular demonstration that this gas is evolved during vulcanization, and in large quantities, and shows conclusively, that in thick pieces, especially, the heat should be slowly raised so as to allow the gases to escape before the surface becomes indurated, and the rubber should be under strong pressure to prevent porosity and insure a successful result.

COMPOUNDING RUBBER.

In making rubber compounds, the caoutchouc may be mixed with sulphur and the coloring matter by being passed repeatedly

between steam-heated rollers, or the caoutchouc may be first reduced to a pulpy state by some one of its solvents, and the sulphur and other substances then mixed with it; in either case, the sulphur and coloring matter should be previously ground very fine, and the whole thoroughly incorporated together to insure a satisfactory result. For experimental purposes, the latter method of mixing can be readily practised by any one. The only apparatus required is a broad-mouthed bottle in which to soften the caoutchouc, a muller, and a glass plate upon which to grind the colors, and a spatula to mix the ingredients. The solvents, coal naphtha or benzine, readily reduce the caoutchouc to the proper consistency; but, after being mixed and the solvent evaporated, the rubber is dry and does not pack well. Oil of turpentine leaves the rubber somewhat adhesive, and in a good condition to pack. Therefore I have found it a better plan to soften the caoutchouc in oil of turpentine, or (which I now use) in equal parts of naphtha, or benzine, and oil of turpentine. When the coloring matter has been ground in linseed oil, the caoutchouc may be softened in naphtha or benzine alone; the oil communicates to the mixture an adhesiveness, so that it will pack well, but I am inclined to believe oil, especially if much is used, materially injures the hardness and polish of the rubber.

After the materials have been well mixed, they should be spread upon a glass plate, and allowed to remain there until the solvent is evaporated.

In the following experiments, the best Para rubber was used, the time and temperature in vulcanizing, the same as for the American Hard Rubber Company's red rubber.

TO TEST THE COMBINATION OF CAOUTCHOUC AND SULPHUR ALONE.

A { Caoutchouc . . . . . 48 grs.
  { Sulphur . . . . . 24 grs.

This gave a dark-brown rubber, sometimes nearly black

when first vulcanized, strong and tough, and received a good polish. When bleached by the action of the rays of the sun in an alcoholic bath, quite light.

B. — Same proportions as *A*.

In this case, the caoutchouc was a pure article, nearly colorless and translucent. Result, — Color and properties the same, showing that the natural color of hard rubber is a dark brown.

To test the coloring effect of red oxide of iron among the various mixtures made, the following produced the best results:

C	Caoutchouc	48
	Sulphur	24
	Red Oxide of Iron (Rouge)	36

The result varied from a dark brown to a black red, after bleaching, produced from a dark red to a brick red, varying in different mixtures made in the same proportions, color much darker in all than the Company's rubber. Texture good. In one trial where the color was ground in oil the resulting color was better.

VERMILION FOR PRODUCING RED.

Numerous experiments were tried to ascertain the quantity of vermilion necessary to overcome the natural brown and produce a red color; the following mixture may be set down as the lowest:

D	Caoutchouc	48
	Sulphur	24
	Vermilion	36

Some mixtures, made according to this formula, were much lighter than others, owing to the different varieties of vermilion used. The shade in all cases was much lightened by bleaching in alcohol. This formula produced a good, strong, compact rubber, so closely resembling that of the American Hard Rubber

Company in texture, strength, appearance, and in every particular, as not to be distinguished from it; and if not identical in composition, very closely approximates thereto.

To test the effect of the addition of *Shellac* to composition, the following mixture was made:

E	Caoutchouc	48
	Sulphur	24
	Shellac	12
	Vermilion	40

The shellac was ground very fine, and added to the mixture. The result was a good, strong texture, but did not polish so well as formula *D*.

FOR YELLOW.

To obtain a yellow color, various substances were used. Chrome yellow was tested; it gave a slate color, the chromate of lead being decomposed by the sulphur, forming sulphide of lead, and setting the chromic acid free. Stone ochre was also tried, producing a dark product. Naples yellow, with similar effect, both colors being decomposed by the sulphur. Common orpiment of commerce was also used, with little better results. Pure crystallized orpiment, under favorable circumstances when bleached, produced a lemon yellow, used in the proportion as in formula *F*. But this color, called king's yellow or orpiment, is a sulphide of arsenic, and a deadly poison, and is inadmissible for dental purposes. The following is innoxious, and is reliable to produce a yellow color:

F	Caoutchouc	48
	Sulphur	24
	Sulphide of Cadmium	36

This vulcanizes a yellowish brown, but when bleached gives a yellow color bordering on the orange.

A modification of formula *F*, producing a lighter shade, may be made by adding White Oxide of zinc, as

FOR LIGHT YELLOW.

G	Caoutchouc	48
	Sulphur	36
	Sulphide of Cadmium	36
	White Oxide of Zinc	12

This produced a brownish rubber; when bleached a lighter yellow than *F*. Rubber of good texture.

FOR PINK.

To produce a *pink* I have made but two compositions, viz:

H	Caoutchouc	48
	Sulphur	24
	White Oxide of Zinc	30
	Vermilion	10

This gave a yellowish brown, after having been bleached it gave a pink somewhat similar to the English; texture good, but not so strong as formula *D*.

I	Caoutchouc	48
	Sulphur	24
	White Oxide of Zinc	36
	Vermilion	10

This gave a color similar to *H;* when bleached, was a shade lighter.

K	Caoutchouc	48
	Sulphur	24
	White Oxide of Zinc	48
	Vermilion	10
	Sulphide of Cadmium	6

When bleached produced a buff color.

VARIATION OF ABOVE.

L	Caoutchouc	48
	Sulphur	24
	White Oxide of Zinc	96
	Vermilion	5
	Sulphide of Cadmium	3

This when bleached, produced a lighter shade — a light buff.

To ascertain the effect of white oxide of zinc upon the natural brown of vulcanized rubber, numerous mixtures were made. The best Lehigh white oxide was used.

N	Caoutchouc	48
	Sulphur	24
	White Oxide of Zinc	36

After bleaching, this produced a drab, — texture good.

O	Caoutchouc	48
	Sulphur	24
	White Oxide of Zinc	48

When bleached, gave a light drab of good texture, and in appearance approximates very near to that of the American Hard Rubber Company's white.

P	Caoutchouc	48
	Sulphur	24
	White Oxide of Zinc	96

This, after bleaching, gave a grayish white.

These three preceding mixtures were repeated by varying the proportions of sulphur, substituting thirty-six for twenty-four; the object of this was to give the rubber additional hardness. This change, in proportions, had the desired effect in that respect, but at the same time the color was impaired. All of these mixtures vulcanize a brownish color, and require to

be bleached by the rays of the sun in alcohol for their development.

TO PRODUCE A BLACK RUBBER.

T	Caoutchouc	48
	Sulphur	24
	Ivory Black	24

This mixture gave a good black.

U	Caoutchouc	48
	Sulphur	24
	Ivory Black	48

This produced an excellent *jet black*, the rubber was hard and of good texture.

The ivory, or drop black in lumps containing gum, I have uniformly found to produce a porous rubber, while the article under the same name found in commerce, free from gum, gave good results.

Mottled Rubber. By taking several of these different mixtures (such as the taste of the operator may dictate), and cutting them into shreds, then when warmed incorporating them together, and again cutting the mass into small pieces suitable for packing, a very pretty mottled rubber may be made, suitable for handles for instruments, etc.

In finishing mottled rubber, owing to the several colored mixtures having different degrees of hardness, after the file prepare for the polishing process by obliterating the file marks with a flat piece of Scotch stone kept wet with water. After being polished, the piece must be bleached in alcohol to fully develop the colors, although some of the mixtures present a pleasing appearance without the bleaching process.

I have now laid before you the most interesting of the successful results of my experiments in compounding mixtures for making hard rubber, and would now call the attention of those who may desire to pursue this subject experimentally, that to

color rubber, three points are essential. First, the color must remain unchanged at the heat required for vulcanization. Second, it must withstand the action of sulphur at this temperature, and third, sufficient quantity must be added to the mixture to overpower the natural brown of vulcanized rubber, before its shade can be developed. This fact shows us that all highly colored rubbers, or where the brown is widely departed from, must be weakened by their being loaded with so much color or foreign matter; in proof of this I have found no other mixture possessing strength and toughness equal to that made of simply caoutchouc and sulphur.

The following table, gives very nearly, the percentage of caoutchouc contained in several of the preceding formulæ. Also that of Ash & Sons' Pink No. 1., their S.P., their white, and the white made by the American Hard Rubber Company. The percentage given of these latter is based upon calculation.

From the results of the preceding experiments, it is evident we may substitute in the table Ash & Sons' black and the American Hard Rubber Company's brown, for A the brown. Also the American Hard Rubber Company's red, and the English deep red, for D the red.

Formula.	Caoutchouc.	Sulphur.	Vermilion.	Sulp. Cad.		Parts in.
A. Brown	66⅔	33⅓				100
D. Red	44	22	33			99
F. Yellow	44	22	..	33		99
					Ox. Zn.	
H. Pink	42⅔	21⅓	9	..	27	100
K. Buff	35.4	17.7	7.3	4.4	35.4	100
N. Drab	44	22	..	..	33	99
O. Lighter Drab	40	20	..	..	40	100
P. Grayish White	28.5	14.3	..	..	57.2	100
					Black.	
T. Black	50	25	..	..	25	100
U. Jet	40	20	..	..	40	100
					White earthy matter.	
Ash & Sons' Pink No. 1	24	12	18	..	48	102
" " " " S. P.	35.6	17.8	26.6	..	Ox. Zn. 20	100
" " " " White	32⅔	16⅓	..	..	51	100
Am. H. Co.'s White	32⅔	16⅓	..	..	51	100

The calculation for the component parts of Ash & Sons' Pink Rubber, is based upon the method, given in the English patent referred to for making pink rubber for dental uses, and the quantity of fixed matter it is found to contain, and taking formula D as the composition of red rubber. It will be found, upon examination of this data, that if there is any error in the quantity of caoutchouc given to this pink, it is in its favor. A glance at the table will at once show its and other light rubbers' inferiority to either brown or red for dental purposes.

The calculation of the percentage of Ash & Sons' S. P., is based upon the quantity of fixed matter it is found to contain, and that fixed matter having been mixed with a red rubber compounded, as in formula D. This rubber is evidently superior to the pink, but inferior to either the red or brown.

Caoutchouc being the *Cement* which binds the whole together, if any compound should contain but a small portion of it, and should any substance, prejudicial to the human system, enter into its composition (and in the patent referred to for making pink rubber, such substances are recommended), its weakness of texture, from the want of sufficient adhesion of its particles, would render it liable to produce injurious effects by its susceptibility to abrasion in the mouth.

EXEMPTIONS FROM MILITARY SERVICE ON ACCOUNT OF LOSS OF TEETH.

BY

JOHN R. LEWIS, M.D., D.D.S.

Colonel in the Veteran Reserve Corps, U. S. V.

While in Washington I received of my friend, Surgeon J. H. Baxter, a copy of his report to the Provost Marshal General for 1864. I have recently found time to compile from it some very interesting statistics pertaining to the profession.

The war, with its gigantic movements and changes, has enlightened us on very many subjects, and, it will be noticed, is not altogether silent on that in which we are professionally most interested. The facts thus brought to light are demonstrated on such a magnificent scale as to establish them beyond a peradventure. We must of course take into consideration that these facts are established entirely by examinations of males, but the experience of the profession may well determine their importance as applied to both sexes.

Table No. 1 gives the relative condition of the teeth in different localities as shown by the examinations in the different States, and in this respect affording cause for speculation and reflection in the wide difference in condition found to exist. Table No. 2 is of similar import, showing the same, or nearly the same condition to exist in the draft of 1864, and nearly the same relative differences. The total of draft in 1863

and 1864, show a most remarkable fact in the enormously large number of exemptions from loss of teeth; being in 1863 very nearly one-fifteenth of all exemptions, and in 1864, nearly one-tenth. These facts are made more appalling however by the facts made apparent by the comparisons in Table No. 3, where it appears, that although the ratio of the whole number of exemptions is much larger in Great Britain than in the United States, the exemptions from this one cause are little more than half as great, and the difference is still more manifest in France as demonstrated by the very large number examined. But more marvellous still is the condition of the teeth in Belgium, as shown by the table, where we find the exemption to be nearly eight times as great from this cause in the United States as it is in Belgium.

By Table No. 4 it will be seen that this condition of the teeth in this country as compared with Europe, bears no relation to other causes of exemption, or at least to many of them. This table demonstrates some other very important facts. First, that diseases of internal organs, as disease of the brain, spinal cord, heart and lungs, consumption, etc., are in a ratio nearly corresponding to the condition of the teeth. And second, that those causes for exemption which arise from overcrowding, bad ventilation, poor and insufficient food and hard work, such as a feeble constitution, deformity and deficient size of chest, and curvature of spine, scrofula and syphilis, disease of the skin, hemorrhoids, etc., are in an inverse degree in Europe as compared with the condition of the teeth. It would be very interesting to me to trace these differences still further and also to speculate upon their cause, but I must leave it to others who may devote more time to it, hoping and believing that such facts will produce some effect upon the teaching and practice of the profession, looking toward a correction of this lamentable condition of the teeth of the people of this country.

TABLE I. — *Showing Number Examined, Number Exempted, and Ratio per Thousand of Exemptions from "Loss of Teeth," in each State, in Draft of* 1863.

STATES.	Number Examined.	Number Exempt.	Ratio per 1,000.
Maine	14,305	146	10.21
New Hampshire	7,375	170	23.05
Vermont	6,719	140	20.84
Massachusetts	29,028	969	33.38
Rhode Island	4,097	92	22.46
Connecticut	10,818	287	26.53
South Division, New York	24,627	295	11.98
North Division, New York	27,638	385	13.92
West Division, New York	29,759	1,068	35.89
East Division, Pennsylvania	36,294	623	17.17
West Division, Pennsylvania	35,607	798	22.41
Delaware	2,175	19	8.74
Maryland	4,821	45	9.33
District of Columbia	4,290	59	13.75
Wisconsin	12,237	66	5.39
Michigan	5,378	66	12.64
Total	255,188	5,230	20.49

TABLE II. — *Showing Number of men Examined, and Ratio per Thousand, and Number Exempted for "Loss of Teeth," in each State Draft of* 1864.

STATES.	Number Examined.	Number Exempt.	Ratio per 1,000.
New Hampshire	1,441	39	27.06
Vermont	197	4	20.30
Massachusetts	6,689	270	40.36
New York	6,630	229	34.54
New Jersey	7,728	156	20.19
Pennsylvania	10,941	346	31.62
Delaware	1,692	11	6.50
Maryland	7,686	183	23.81
Minnesota	3,125	69	22.08
Kentucky	4,461	49	10.98
Ohio	10,229	193	18.87
Michigan	368	5	13.59
Total	61,257	1,554	25.37

TABLE III. — *Showing the ratio of exemption from military service, for mental and physical infirmities in the United States, Great Britain, France and Belgium.*

	Number Examined.	Number Exempted.	Ratio per 1,000.	Number exempted for lost teeth.	Ratio per 1,000.
United States — Draft of 1863.	255,188	80,134	314.02	5,230	20.49
United States — Draft of 1864.	61,257	15,744	257.02	1,554	25.37
Great Britain, April 1, 1842, to March 31, 1852	171,276	57,381	335.	2,298	13.4
France, 1831 to 1843, inclusive,	2,097,876	680,560	324.40	17,709	8.55
Belgium, 1851 to 1855 . . .	201,770	64,696	320.62	52	.26

TABLE IV. — *Showing the ratios of rejections for certain diseases and infirmities in the United States, Great Britain, France and Belgium.*

CAUSES OF REJECTION.	RATIO REJECTED PER 1,000 EXAMINED.				
	United States.	Great Britain.		Belgium.	
	1863.	1860.	1861.	1831 to 1843.	1851 to 1855.
Imbecility	3.88	2.20	.50	....	1.69
Epilepsy	8.39	....	....	1.9	.94
Disease of brain, spinal cord, heart and lungs	45.35	15.36	27.27	....	....
Consumption	15.00	2.26	5.00	....	....
Feeble constitution, deformity, and deficient size of chest, and curvature of spine	44.29	57.03	97.45	94.8	19.08
Scrofula and syphilis	5.16	21.13	28.52	....	10.5
Disease of the skin	1.92	5.54	8.63	12.51	6.34
Disease of the eyes, myopia included	19.97	28.75	28.52	20.00	13.08
Disease of the ears, and deafness	7.13	3.10	4.51	....	1.68
Disease of the nose	.51	.77	1.63	....	....
Stammering	1.76	1.31	1.63	....	....
Loss of teeth	20.49	9.52	7.76	8.5	.26
Hernia	30.93	11.79	14.89	2.45	3.99
Hemorrhoids	3.59	5.00	5.88	....	....
Varicose veins	7.63	28.63	40.79	....	....
Varicocele	3.15	13.39	28.52	....	....

DISCUSSIONS

ON THE

REPORTS AND PAPERS

PRESENTED TO

THE ASSOCIATION.

ON THE REPORT OF THE COMMITTEE ON DENTAL PHYSIOLOGY.

Dr. ATKINSON. — I have some remarks to make on the subject, but time is so short, that I should either be unable to compress my feelings into it, or do injustice to the subject in some other way.

Dr. KENNICOTT. — I move that the further consideration of the subject be postponed until to-morrow.

Dr. ATKINSON. — I hope it will not go by the board that way. Those that care nothing about the subjects before us, I care nothing for. Let them go the way they are desirous to go; but every earnest soul, who has taken upon himself to operate upon the human body, I claim the attention of.

You are aware that mathematics is said to be the only demonstrated science. Now that science must have attained certain lodgments in the individual before he can compare. Physiology is as certain as mathematics — anything that is not capable of being brought to the test of principles is as yet theoretical; or it may be worse, it may be immaterial, fanciful or hypothetical.

The question was asked, Whether there could be infiltration of lime salts into the enamel fibres, or between the enamel fibres, after eruption. I answer, unhesitatingly, Yes: in every instance. There must be a nutrition to every living organism; and when we ask what that nutrition is, It consists in a sense of need, and calling to it such elements as are capable of satisfying that need; and they find a lodgment in the exact ratio of the demand in the specific locality, and bring with them sometimes those things which are injurious.

Those of you who have been called upon to cut children's gums will recollect with what tenacity the instrument stuck to the periphery of the teeth, precisely as if you were cutting into cartilage or India rubber; after it is exposed to attrition, and you come to cut it, the instrument will no longer cut but slip over the denser surface: you essay to extract it, and the enamel will crush and tumble all in pieces. Now, this is at the point of formation. There is a nutrition which goes on, and I give you these examples, by which you can test it for yourselves. Try an adult tooth, and see if it will be easily riven into its roots. It will break up irregularly, and there will be no direct lamination whatever. If there were no nutrition in the enamel, it would be but little better protection to the structure that is immediately beneath it — which it has been expressly placed there to protect — than when it had been softened by the medicaments of this Western country.

In those cases, then, where the teeth have been softened, they must remain soft, until they are swept away. Then what is the law? To supply a sufficient amount of lime salt, so that they can be restored. And what is the rationale? We know that precipitated chalk has been used in abundance around the teeth, so as to cover the gums, and, the teeth have become just as good as ever they were, and have remained in the mouth to old age. I claim these are indications that the enamel has been nourished.

I am on the record, of some years' standing, for saying that dentinal fibrils were simply the consolidation of *liquor sanguinis.* I have spoken of it under the name of blood, nerve mass, infusorial mass. All these terms refer to the same thing, and out of them all nourishment, except ethereal nourishment, is received into our organism, into each cell which constitutes the elementary structure out of which our organs are produced. Dentinal fibrils are consolidations of the *liquor sanguinis,* whose duty it is to keep up the supply and waste of the whole body.

Dr. Fitch very beautifully refers to the origin of being in the individual, and very wisely ignores the idea of creation. We have to do more than deal with germs; we must deal with that from which the original germ had its origin.

I assume that crystals are organisms, and the lowest organisms, — I say here, they are in the mammalian dental system — the enamel being the exact symbol of the crystal, and the pulp being the true animal or living being. Now, in this great living being, it is ordered that they shall manufacture teeth, and that is done simply by the modification of the currents of heat, light and electricity. These build up the organism under a specific type.

A man said in my presence, that he had attained to a knowledge that enabled him to say of dentinal fibrils, that their original structure was white neural cells, and so, nerve matter, and proved beyond a question the nervous character of the dentinal fibrils. I asked the gentleman if he would favor me with specimens and with the law of that pronouncement. We were very careful not to let the time go past with the gentleman. The specimens I had there myself were not the right kind, and he promised to make me some himself; but he never did.

I have been in the habit of explaining to my patients, when asked if I knew the cause of dentine being so sensitive beneath the enamel, and why, after cutting into the pulp, it would cease to give pain, or so little so as to be of no moment, —

sometimes, entirely cease. Well, in my ignorance and simplicity, I reasoned in this way: We will assume that each tube is a gloved finger, and that the fibril is the finger. When this glove becomes frozen, it stands up stiff, and we can slice it off without making the fibril vibrate so as to press down much upon the sensitive pulp. Where decay takes place, these tubes become soft, and the compression of the fluid takes place; so that it vibrates against the nerves themselves in the pulp proper. When we get down to where the ossification is stiff enough to allow cutting it across, the pain ceases.

Now, there is one other condition, and I am through with that department. Man is not now what he was formerly said to be. This *liquor sanguinis*, of which I have spoken, is simply the elementary mass out of which the system is nourished. When that becomes acidified you have sensitive dentine; and that is the philosophy of it. It is that which is the medium of the electric and magnetic currents; and then we go back of that, and have a mental presence, which is nothing but the concentrated infiltration within ourselves of the sun presence, that we, by volition, see through; so that, if we are incompatible with the patient, we hurt him immensely, and, if we are compatible, we can cut more easily.

Do you understand what I mean by the incompatibility of relation? If you don't, just let me call to your mind the position that you are in toward the patient that you treated. If you were incompatible with him, your treatment was a miserable abortion. You were not obeying the highest conception of good. This coinciding of patient and prescriber is the legitimate condition of all power to neutralize diseased conditions.

Gold is simply retained in our practice because it holds within itself the tension of life presence that is agreeable to the ghost of the tooth, so that it can take up its residence and live there, as it lived in the tooth before.

A Delegate. — Will the gentleman describe the ghost of a tooth?

Dr. ATKINSON. — The best way I can describe it is this: We have a certain creature we denominate man; another, woman, etc. We see its outward form, and we ask ourselves, Did this always exist? And we say, No. What was it brought him up from that? Only that there was a divine presence there that took up the infusorial mass and moulded it as it desired.

A DELEGATE. — Is there a ghost to each separate tooth, or one ghost to the whole?

Dr. ATKINSON. — The ghost of the whole is like the Government of the United States. It presides over every part in general; but it has special outposts, and it presides over every one of them, even down to the little corporals, which have ghosts themselves as legitimate as it.

The typal form is spherical, but this is modified by the pressure of adjacent parts.

How is it we have sensation at all? It is simply because the seat of sensation is less oxidized. A rheumatic patient's back, is, as it were, nearly all nervous; and such persons are nearly ready to take their departure. Now, what is decay? What is the solution of the enamel of any of these teeth? It is simply the driving out of this organizing presence that I denominate the ghost. The lime salts will be dissolved, and washed away, and then the animal matter will be left as a leathery, tough mass.

Now, suppose it is the other way. Suppose it is an alkali like sozodont. If we have such an abominable concoction to destroy human teeth, we want to have no excess of a very excellent element. Potash will dissolve out everything but the lime. If it is used in the West as it is in the East and the South, doing the mischief it is, I want you to understand what the nutrition of the enamel is, and what that of dentine is. We have always gone off with that abominable heresy, that alkali would do no harm, and that acid would. What we want is the due equation between these two. When we have come to understand the physiology of a single cell, we have the ability to make a code

of physiology that may defy the power of the human mind to upset.

The Association then adjourned until 10 o'clock the next morning.

SECOND DAY. — Wednesday, Morning Session.

The resolution offered by Dr. RICHARDSON, with regard to discoveries, was discussed as follows:

Dr. MORGAN. — I am opposed to this resolution; for the reason that I do not want to see any member of our profession wearing false harness. I have suffered a little in that respect myself, and am perhaps a little sensitive about it. I want this Association to award to no man any honor which does not justly belong to him, — which is not, in fact, his own property.

Dr. RICHARDSON. — I offered that resolution with a view, if possible, to use the influence of this Association, to correct a very common practice on the part of practitioners, even those who are liberal, of keeping for themselves, — for their own private use, — valuable improvements or appliances, and modes of practice, for an indefinite length of time, until they are brought before the profession by some one else publishing the results of their experience, or experiments. It is not unusual to see, through our journals, on occasion of some one publishing a particular appliance, responses from half a dozen, who claim that they had used the same thing for years before. I ask if it is creditable, for any one who has something valuable to keep it in that way? I recognize it as a duty to give to the profession the results of any discovery or mode of practice which may be of value. I offer this resolution for this purpose, that the man who has first published, shall be regarded as the originator.

Dr. ELLIS. — I have not a word to say upon this resolution; but I do agree with the mover of it, that the man who makes a discovery or invention should have the credit of it; and, if this

society can place the discoverer right, they are under obligations to do so.

I have a word or two to say, however. I regret exceedingly, sir, that the time of this Association is to be absorbed by matters outside of the legitimate objects for which I had supposed we had assembled here. As a simple man in the profession, I do not pretend to think of very much except the teeth. I came here to learn much from men older than myself, and wiser than myself in reference to the teeth; and I feel but very little interest in the toes or in the eyes. Still, I am well aware that the toes and the eyes and the teeth all sympathize with each other; yet I have never treated corns, nor diseases of the eye, nor do I ever expect to do it. But I do treat the teeth. I, therefore, wish that the eye were left to the oculist, the toes to the chiropodist, and the teeth to the dentist.

Dr. McQuillen. — I regret to occupy time upon this subject, but it is quite evident that the objects and aims of this Association do not appear to be thoroughly understood by some present. It was not established for the purpose of confining our attention exclusively to the consideration of the dental organs. The structure and preservation of the teeth are, of course, primary considerations, but these organs, in addition, bear important relations with the other portions of the human economy, and it is a matter of great moment to the profession and the community that all dental practitioners should clearly understand them. It matters not how thoroughly one may be acquainted with a part of the economy, his sphere of usefulness must of course be much less expanded than it would be if he understood the whole.

It is owing to the disposition on the part of the profession in the present day to become thoroughly acquainted, not only with our specialty, but everything that appertains to it, that has elevated our calling from a mere mechanical occupation to the position of a liberal profession. When taking into consideration how often ophthalmic affections have their origin in diseased teeth, it

requires little argument to prove that the dentist ought to be so well acquainted with the relations existing between these organs as to be able to give a rational and scientific opinion, when called in consultation with a medical practitioner. It should also be borne in remembrance, that with a single exception (and this was by the will of the Association), the lectures that are to be delivered would not occupy the time set apart for the sessions of this body, but during the interim between the morning and afternoon sessions, and in the evenings.

Dr. LAWRENCE moved a reference of the Resolution to a committee of three. Seconded.

Dr. ALLPORT moved that both Resolutions be laid on the table. The motion was adopted.

The report on Dental Physiology was now taken up.

Dr. MCQUILLEN. — In entering upon the consideration of this subject, on account of certain views which were advanced yesterday afternoon, I feel that it is incumbent upon me, in the first place, to briefly define the marked distinction existing between the mineral, vegetable and animal kingdoms. These were so spoken of as to rather tend to the adoption of erroneous views with regard to the relation which they hold one to the other. It has been said here, that "all things differ but in degree." I would suggest that things differ not only in degree but in kind, and that the difference in kind is so great that one kind cannot produce another kind.

When carefully examining minerals, vegetables and animals, certain marked characteristics are observable in which animals and vegetables in various particulars resemble each other, and differ entirely from minerals. On this account, the former are spoken of as organic, from the fact of their possessing organs adapted to the performance of special functions. The mineral kingdom, not exhibiting this adaptation of parts to separate functions, are denominated inorganic, and chemical analysis

resolves them into those simple elements which admit of no further subdivision.

The inorganic and the organic differ from each other, first, in origin: inorganic bodies do not spring from a parent. The animal and the vegetable, on the contrary, are the offsprings of beings similar to themselves; and it appeared just to infer, that every animal or vegetable must arise from an egg or seed. They also differ in shape, in size, in chemical character, in texture, in mode of preservation and in termination. Again, organized bodies are found in two states or conditions: one, that of life or capacity for action; the other, that of death, in which all the vital action has ceased and in which disintegration succeeds as a natural consequence. Properly speaking, there is no such thing as life and death in the inorganic kingdom.

Although resembling each other in many particulars, the vegetable and the animal differ from each other on account of the exclusive possession by the latter of sensation and voluntary motion.

The teeth, as organic structures, are subject to the law of waste and supply which prevails in other parts of the economy; and the liquor sanguinis, or nutrient portion of the blood, only passes into the dentinal tubuli. The circulation of this in the tubuli is effected by capillary attraction, and the elective attraction existing between the fluid and the tissue to be nourished, as there are no blood-vessels in human dentine. With regard to what are denominated dentinal fibrils, which some look upon as filaments of nerves, on account of the appearance they present when viewing a section of dentine in the field of the microscope, I believe they are nothing more than coagulated fibrin. In some recent experiments, I placed a few drops of blood under the microscope, and, as coagulation proceeded, with the point of a fine needle obtained, by moving it about in the fluid, shreds of fibrin which resembled in many respects the dentinal fibrils. I do

not present this as positive confirmation of the position, but trust that others will institute similar experiments.

The sensibility generally manifested by dentine, when a foreign body comes in contact with it should be regarded as a physiological phenomenon rather than a pathological manifestation, the tooth resenting injury in the same way that any other portion of the economy would. There is a difference of opinion with regard to whether the painful impression experienced by the patient is due to vibrations communicated from the edge of the instrument along the dentine to the pulp, or to pressure of the instrument on the liquor sanguinis in the dentinal tubuli being continued on to the pulp; I would not positively assert that the former is unquestionably the correct explanation, but it appears to me much more satisfactory than the latter. It might be due, however, to both combined, — in many instances, if not in all.

Dr. Atkinson. — I have a few words of objection, — not that there is any difference between men as to their ideas, but as to their pronouncement. The gentleman says that capillary attraction holds the domination over the circulation in the dentine. Now, can it have any power unless the two ends are open? In the nature of things, it is impossible that capillary attraction should dominate over the tubular circulation.

One other statement is, that the inorganic world is not born. Now, I have been at the birth of crystals many times, and I have looked also at the blood column under the microscope. I think I understand what is concerned in this whipping of fibrin. In preparing sections of teeth I have split them and held them open, and have observed exactly what Mr. Tomes says occurs. When you first open it, the fibril appears to be thick, and it becomes smaller as you lengthen it, and breaks ultimately. In certain cases of young teeth, where the crown is only formed, and the roots have just begun to form, if you break the crown in that case, the fibrils are very large, and then they are able to throw out this matter, so that it accumulates on the

end of the broken contents of the tubuli. When the tube is more ripened, there is more oxygenation of this mucous mass, so as to bring about greater differentiation. There will be a toughness in the fibrils,and they will curl a little. If the coagulation has been greater on the one side than on the other, it makes an effort to resume the original type of sphericity, and curls it down. When the tubule is exactly equal in the coagulation of its sides, it simply contracts, like India-rubber.

Dr. FITCH said, that, as we change the character of the dentine by acids there is produced a sensitive condition, or a diseased condition; or rather, we introduce disorder or disease. He closed, however, by saying that it could be remedied in two ways, — constitutionally, by acid medication — locally, by the exhibition of alkali. Submit teeth to the action of acids in the mouth, and they soon become extremely sensitive. Whenever we preserve the normal condition of the dentine, we find very little sensation.

There are difficulties connected with this subject, I admit. In some teeth you will find that the roots are excessively sensitive, and other portions are not so; and, if it was due to pressure, we should have uniformity of pain whenever we cut the dentine in the same direction. But, from the fact that there is a difference in the uniformity of pain, that theory does not hold. The very moment you approximate the disintegrative condition, you heighten and increase sensation and sensibility. All diseased action is nothing more than perverted nutrition, whether we have it in the small or in the larger organs of the body. Any agent that produces this perverted condition introduces disorder into the organism. Nutrition embraces two acts, called integration and disintegration. Where they are equal we have ease; where they are unequal, we have disease. And hence to restore any diseased part to health we must restore this equilibrium of action. Now, the successful treatment of sensitive dentine becomes quite plain and easy of accomplishment. Establish

harmony of function, constitutionally, and arrest local disintegration, and the desired result will soon manifest itself.

Dr. H. S. Chase, at this part of the discussion, read a paper on Dental Hygiene.

Dr. J. W. Ellis. — I like the ideas expressed as to lack of nutrition in the mother's milk, — the absence of those materials that make an animal strong. It has always appeared to me, that this matter is too little understood by the profession. The question is often asked, "Why do children's teeth decay so soon?" No dentist can enter into that subject in a few minutes. I wish, therefore, that some measures could be taken to bring the subject properly before the public.

Dr. Richardson. — I think that the profession have been too much absorbed with those influences or agencies which act immediately or directly upon the teeth, producing decay, — chemical agents, for instance. There are certainly considerations behind all these of vastly more importance to us; because it is a comparatively easy thing to look into the mouth of a patient, and take out a decayed tooth, or fill it. That is chiefly and principally mechanical. If the profession should look at one thing more than another, it is the recognition of the leading idea in the very excellent report under consideration, that the defects in the teeth are defects originating by conditions induced by errors or defects in nutrition; and this occurs at the period of *fœtal* life, — or in *uterine* life, — and the period subsequent, — in the time at which the teeth approach their consolidation. Now I think we have fallen short of our mission, if we confine ourselve, to the examination of the appearances in the mouth, ordinarily.

Dr. Perkins, of Milwaukie. — If we are going to look for healthy dentition, we must go into the wilderness, where dwells the aborigine, and there we would find a healthy dentition, as well as a healthy ossification throughout. Civilization is the enemy of health, and therefore we have to go back to society in its simplicity before we can find a healthy organism.

People do like to gratify their appetites, and luxury will cheat mankind, not only out of their teeth, but out of all their health. When we begin to live, we also begin to die; and we shall find ourselves, by pursuing these evil habits, absolutely rotting from head to foot, as we see our teeth rotting. We have to take things just as they are, and the question is, What can we do with them? Give advice as best we can, and judge, and exercise what influence we may to inspire the patient to appreciate the true nature of life, health and disease, and the conditions necessary to secure health; and we never can do good in this direction without obedience to the laws of life.

Dr. PERKINS, of Albany. — I sometimes think that this subject is about to get the upper hand of us, in spite of our teeth. It appears to me that too much time is spent in these continuations of dentistry. I am one who comes here to learn of what is essential to my success in practice on what comes every day within my operations.

The PRESIDENT. — I call the gentleman to order. Dr Forbes makes the remark that you are speaking on matters not relevant.

Dr. PERKINS. — I am very much inclined to the opinion that it would puzzle the Doctor to furnish evidence of it. I am not aware that I have said anything irrelevant. I think, however, that it would be of the greatest advantage for the course pursued to be a little changed, — that is, that we do not go into the ramifications of the discussion.

Dr. BOGUE, of Chicago. — In the past, the meetings of this Association have been employed in practical questions. I have observed, with regret, that there seems to be some conflict between theory and practice. Dr. Perkins, of Milwaukie, asks What shall we do with the patient? It seems to be, that the very fact that we study the laws of nutrition will, perhaps, enable us to find some manner which will relieve them. Dr. Perkins says it is not possible to get our patients to obey the laws of health.

Still, if they are told of it, they are probably more likely to obey.

Dr. WATT, of Ohio, moved that the subject be tabled until the disposal of the special order fixed for 12 o'clock.

Dr. MCQUILLEN then delivered a very able lecture on the Anatomy and Physiology of the Eye, illustrating his remarks with models and diagrams. After referring to the source, the composition, and laws governing light, and minutely describing the anatomy of the organ, and explaining the physiological phenomena connected with it, he directed special attention to the intimate relation of the nerves of the teeth, with those of the eye, and to the sympathy existing between them, and also to the affections of the eye, which were most frequently caused by diseased teeth. He then spoke at some length, on the necessity of the dentist taking proper care of his eyes, and drawing upon a personal experience, referred to the kind of light that should be used to operate in, precautions to be observed to protect the eye from excess of light, as well as valuable hints with regard to the use of napkins, the position of the head of patient and operator during the performance of dental operations.

The Association then adjourned to three, P.M.

SECOND DAY.—Afternoon Session.

The President called the meeting to order at half-past three, P.M., stating that the regular order of business was a lecture upon the eye, from Dr. Hildreth, in charge of the Government Eye and Ear Infirmary at Chicago. Dr. Hildreth, having been introduced to the Association, gave a very interesting description of his mode of operating upon the eye, for the cure of various diseases requiring surgical operations. His remarks, which were illustrated by models and diagrams, were listened to throughout with marked attention. He concluded with a beautiful tribute to the art of dentistry, and said that it was certainly keeping pace with, if not advancing more rapidly than, other specialties.

The discussion on Dental Physiology was then resumed.

Dr. TAFT. — This subject of Dental Physiology is one involved in considerable mystery, if we take all that is said and all that may be said on the subject. Now, in the development of any organ, and in the maintenance or sustenance of any organ, there is, of course, vitality, or vital power, which presides over and controls the materials of which the body is made. The question presents itself to me, how much may we control or overrule, by any circumstances, this vitality, this moulding and building and sustaining power? How far may we control this influence? That is one thing. There is evidently a vital power, which builds up into particular form, and makes the individual, or makes an organ. There is that power — that specific or particular thing. Now, it occurs to me that this may be controlled. We find in different individuals, different degrees of ability, or strength, or power, and we have therefore different degrees, from a weak to a strong and vigorous vitality. In some we find a feebleness of character, that with even the best prepared material, it is scarcely able to work it up into a possible structure. The question is, can we modify the operation of that life power, that builds up the material that makes the tooth? or are we to let go that idea entirely, and give our attention to the preparation of food, and give it to this power, this builder, this organizer, and let it work it up as best it may?

Now, in my opinion, very much may be done to influence this vitality, or building power. Perhaps it is alike in all cases, but only hedged about by a different set of circumstances, which prevent its operation as perfectly in one case as in another; but my impression is, that there is a diversity in the power itself, that it is not always the same. You take this power in some cases, and it will take material of almost any kind and build it up into a nice structure, while, in others you must temper very carefully what you give it, and then perhaps only an imperfect structure will be made. The question

recurs, can you do anything to make it grow, — to make it stronger? Can you do anything that shall strengthen this builder, this organizer, so that it can make a more perfect work? Very much depends upon the nutrition — upon the material given to that power to use, but not so much as does depend upon the ability of this power to use it. Of course the material must be there, and the better the condition it is in, the more easily will it be used in the building up of the structure. Here is this life force. I apprehend that this force does not come and grapple with the material itself, but that there is an intervening agency, viz: the nerve force. Can we operate upon that? Can we change its condition, or modify its influence and power? This seems to be admitted by all. Between the life power itself, and the gross material, is this nerve power, or electric nerve influence. This intervening influence, it appears to me, is very susceptible of modification; when you change the condition of this life power, you will change the action of the power itself. The condition of the material which is used to build up the structure is a very important matter. The elements must be there, and in proper proportions, for the purpose they are to subserve.

Dr. WATT. — There is very much in this subject of Dental Physiology, if we could get it out; and the way to make discoveries is, to think so intensely upon a subject as if something was to come out of it. By devoting careful thought to a subject, though we fail, some one else does not, and progress will be made. Solomon was a great man; but "a ship in the midst of the sea, and the way of a man with a maid" were too wonderful for him. They are not so wonderful now. Now it would be worth a million of dollars to this Association to know how the vital principle operates in producing a tooth. If we could understand how one tooth was produced, we could understand them all, for they are all made of the same materials, and by pretty nearly the same process. I presume that the vital force

cannot create anything. The vital force is, I know, the agent in causing digestion; but I do not think it would be proper to say, that while it is doing that it is organizing the structure; but it is preparing the material. While a man is hauling lumber and bricks, he is not then building a house, but he is preparing for it. Now, if we knew the exact proportion of each constituent necessary to make a healthy dental structure, that would be very useful to us. Some would say, that is very easy,—we might find out by making a careful analysis of the healthy tooth. It does not appear, however, that the fluids which the vital principle works upon, must have these ingredients or elements in the same proportions that they exist in the teeth. It may be, that nitrogen is much more easily used than calcium; or calcium more than some other element. Now, if we knew exactly what the best proportions of these constituents were, we should know a great deal. Now if you pull off the arm of a craw-fish, a new arm will grow. It is guided by instinct, and takes the food in such proportions that the new arm grows an exact image of the one that is lost. What is it, and in what way does the vital principle act as to the size and shape in that case? Did a spiritual body remain there of exactly the size of that arm, and was it then stuffed as you would stuff a sack?

Most certainly! If that is the case, the spiritual body grows in the same proportion as the natural body grows. Now, by the time the arm is grown, it is not the size of the arm that was lost, but the size of the arm of the other side. There is something that acts as to the size or measure of the arm of the crawfish. There is something which the vital principle uses in forming every organ, and it just uses it so as to make one correspond with another. Now what materials are these, and how are they to be prepared? is the question. I am willing to take a patient as he comes to my office, but I am not willing to take the next patient as I take this patient. If I am a family

physician, and the eldest child dies of tubercular disease, I do not wait till the development of the disease in the others to commence precautionary treatment. It is my duty to advise them of it, and not wait until the second takes consumption. So when a young mother comes into my office, she is very likely to have some trouble with her teeth. It is a sad fact that not many American women can nurse a child without the salivary secretion, which should be alkaline, becoming acid. Now, having given her advice as to her teeth, am I to stop there? I must advise her as to the baby's teeth; because, whatever age it be, it has teeth: and if the mother is suffering, as I have said, it shows very plainly that there is another duty for me to perform. The man who does not do this, descends to making a trade of his profession, and sacrifices his own and its dignity.

Dr. NICHOLS. — It seems to me that if we knew the exact constituents entering into the formation of the teeth, and knew the exact food, and the temperamental tendencies of the individual, we could so modify the structure of the teeth, that we should have a formation entirely different from what we started with. We have a given tooth of very hard texture in one temperament, — and in another temperament, we have a different structure, so that it appears to me, if we are to alter the structure of the teeth, we must alter the temperament, and as long as we differ in shades of temperament, we shall differ in structure of teeth. If we knew the temperamental tendencies before birth, we could tell what kind of teeth we should have.

Dr. MCQUILLEN. — In discussing the nutrition of tissues, we must not overlook the fact, that the food introduced into the body, does not consist merely of a certain amount of crude material, but that in addition there is an amount of force present in it which is as important to the economy as the albumen, fibrine, caseine, gelatine, and the phosphates and carbonates of lime, etc.

The plant as it grows, does not merely draw from the

surrounding soil and atmosphere, the materials inservient to its nutrition, but it also absorbs and retains the light and heat which it obtains from the sun. We have no better illustration of this fact than when throwing a piece of wood upon the fire; it burns, and gives off light and heat, proving thereby that there was that amount of force resident in its structure. Or again, the coal which we throw upon our grates in the winter time, as it burns, or the carburetted hydrogen which illuminates this room at night, throw off an amount of light and heat which was obtained by the vegetable kingdom in pre-Adamic days.

The vegetable holds an intermediate relation to the inorganic world and the animal kingdom, in other words, the vegetable obtains from the soil, atmosphere, and the sun, materials and force, which the animal can appropriate as food; while man, feeding upon the vegetable and the animal, obtains the supply required for the purposes of his economy.

In former days, light, heat, electricity, and magnetism were spoken of as imponderable substances; but this is a misnomer, they are not substances, but forces. Even those who recognize this distinction regarding and describing these forces as separate and distinct entities, made the subject difficult of apprehension, but of late they have come to be regarded by the leading scientific men of the world, as correlated, conservated, or modifications of one great force. Thus when light or heat disappears, it is not annihilated (for there is no such thing as annihilation of force or matter), but an equivalent of force appears in another form, — it may be electricity, magnetism, or vital force; thus the force obtained from the sun, in the food which we eat, was converted into vital force in our economy.

The seed or egg is developed into a plant or animal by the forces and materials which it obtains from without. Formerly the force was supposed to be resident in the egg or seed, and to have been derived from the parent. Such is not the case, however; the governing principle alone is derived from the parent,

and is present controlling the operation of the forces and the proper disposition of the crude material demanded by the organism. This is true of vegetables, the lower animals and man.

Dr. Hill. — I feel extreme diffidence in speaking on this subject. It is a subject of uncommon interest to me, and I shall feel grateful to the man who will illuminate this dark subject. Whether we regard the subject under the head of correlation of forces, nutrition, spirituality, or whatever it may be, it is worthy the attention of us all, and I am glad the attention of this body is called to the subject. I have long thought the medical profession have committed a grave mistake in so long ignoring in practice the higher and nobler elements of man's nature.

Man has been treated as an animal, and all his higher qualities have been utterly and constantly ignored. Some have come to regard him as an intellectual animal, and having been instructed, has thus advanced. Have we gone far enough when we hold it to be man's special glory that he is an intellectual animal? May we not talk of the nobler spirit of man which crowns the whole? We have to deal with moral and spiritual force, and it is folly to ignore it. Violating physical laws the penalty is suffering; but there are also moral laws. When we talk of force, we can only reach force as we approach the Father of our being, and get into that which is spiritual. We must correct our ideas of power in this respect. It seems to be very clear that there is a power in us that wills us to act and think, — call it what you will, the power exists. I believe that there are forces, that there is a power, and all we want to know is, how to act so as to unite the higher with the lower. Dr. Atkinson says it is "compatibility" we need; an idea worthy of consideration. I most firmly believe that the dentist who brings to the performance of his duties the inspiration of love to God and his fellow-man, with an unshaken purpose to discharge them to the best of his ability, that man is doing his highest duty. And I tell you the world would be elevated in

every respect to-day, if men could be moved to act from these impulses.

Dr. BUCKINGHAM. — There has been a new idea started recently, that these forces all are the same. Whenever we trace the matter back, we find we get to the great first cause; and if these different modifications of force are traced back to this great first cause, we are only getting to where we were before. If heat, light and electricity are all modifications of one force, then may not that force be the great first cause? And that, I am sorry to say, is the tendency of this new philosophy that is coming up, and we are going back to the materialism which existed before Christ. We have known, all the time, that a certain amount of heat would produce a certain amount of electricity and magnetism; and now they contend that the heat is changed into electricity. Now, they say that we have in the universe so much matter, and so much force, that it is dispersed all through the organic and the inorganic world, and that man is nothing more than a series of crystals.

Now, following this doctrine through, step by step, you must irresistibly come up to this same point. I cannot stop here, now, to give you a clear idea of what I mean, but it is shown, and to a certain extent it must be true, that a certain kind of force is persistent, because we start with the inertia of matter; that when it is at rest it has no power to start itself, and that when in motion it has no power to stop itself. Now, if it is in motion, and stops, it must impart this force to something else. Now, is this force heat, or does it manifest itself in heat, or electricity, or chemical affinity?

To go a step further: We have recognized all along that these chemical changes are taking place, and that they will take place as long as the world exists. Matter has a force with it for ever. It may combine in the form of water, but it still remains there, — separated from the oxygen and hydrogen, as it does not enter into them, — but still it is there.

Now, the next question is, Is that force a persistent force, when the oxygen and hydrogen are combined together, or is it a new force? Is there any new creation, or is it only a new example of the application of creative power?

Now we come to the line of demarcation when we come to organic matter. Whenever we get to the organic structure, then our power stops. There is another force comes in there, which is the life-force. That must be derived from the parent, because an organic substance never came from anything but a parent. But now they argue — take Spencer and Hume and Gibbon — that is nothing but a combination of forces, and that there is no spirit in the matter at all. And then you come to man, which is nothing but a mass of matter, thrown together by a certain combination of these forces; and as these forces go away when a man dies, he goes back to the material world.

Here there is nothing to look forward to but materialism, the worst kind of philosophy that ever was preached. Now, take Herbert Spencer's theory, and he follows it out in that style. that if the first soul is formed by the combination of atoms, and this has the power to make another soul, then man must be a series of atoms, and, if so, then his intellectual force must be, and then also his spiritual existence must be made up in this way. He does not go so far as to say that he has no future state, but he believes generally in this mode of going on.

I think our duty is here not to spiritualize, but to follow up as we would in investigating anything at all, and go to the foundation, investigating it, and then going on a little further and a little further. We might let our imaginations run ahead; but he who would follow it step by step, generally makes most progress.

Dr. McQuillen. — I fear that I have trespassed too far upon the patience of the members of this Association, and recognize that according to parliamentary usage I have no right to speak again on this subject; but I would esteem it a favor to have an

opportunity to respond to the remarks of the gentleman who has just taken his seat.

On motion, the privilege was granted.

Dr. McQuillen. — There is nothing, perhaps, that tends more to retard the progress of science than the cry of materialism and infidelity when some new fact or theory is presented which the world is not prepared to receive. For daring to assert that the world moved, and thus setting himself up in opposition to the dogmas of the day, Galileo was seized, by order of the Inquisition, and upon his aged and trembling limbs compelled to recant; but as he did so he whispered, "It does move." Within the past century, when geologists first asserted that the world was more than six thousand years old, the cry of materialism and infidelity was raised, and great opposition was made to it; but the facts were so numerous, so easy of demonstration, and so irrefutable, that the position could not be controverted. It was then found that the discrepancy was not between the geological and Biblical record, but in man's interpretation of the latter. And now pious, learned and eminent divines, in place of opposing the geological record, draw some of their strongest arguments from it in support of the Scriptures.

Within the past few years the discovery in the Swiss lakes, in the quarries of France at Neufchatel, on the banks of the Mississippi near Natchez, and other parts of the United States, of human fossil remains and implements, indicate a higher antiquity to man than has heretofore been accorded to him. In opposition to this again has been raised the cry of materialism, but if the facts should prove unquestionable, there is no alternative but to accept the conclusion as true. With all this, those present are, no doubt, familiar, but it is something new and passing strange that such objections should be urged against the views at present entertained in regard to the correlation, conservation, or conversion of the forces, supported as they are by Liebig, Groves, Faraday, and the reverent Carpenter, who, in

his work on Human Physiology, makes constant reference to an all-wise and overruling Providence. The day has passed when observers and teachers were imprisoned or burned at the stake for advancing that which men regarded as false and materialistic; the flesh is no longer tortured, but the spirit is, by the pointings of the finger and the use of such epithets, and this has so intimidated some men that they have ceased to labor in fields where their efforts might have resulted advantageously to the world. It is a source of congratulation, however, that there are some restless minds so constituted that they are not affected by such things or content merely with the knowledge that has been acquired, but they must be constantly reaching out into undiscovered fields, seeking for more light. Columbus discovered a new world because he believed that there was one to be found by starting on a voyage of exploration, and thereby augmented immeasurably human happiness, and changed the purposes and prospects of society.

This morning, I carefully described to you the human eye; and, for my part, I want no better evidence of an all-wise and great Creator than is presented in that organ, so beautiful and so perfect in its structure and adaptation to the ends for which it was formed. The operations of God, however, are not those of chance; they are governed by fixed and immutable laws, and the materials and forces which have been referred to are the agents through which our Creator's works are accomplished. To my apprehension, the investigations at present progressing in this direction are not in abnegation of, or in opposition to, a great creative power, but only trying to discover his grand truths; and I hold that the geologists and other scientific men, who, in a reverent spirit, prosecute their studies and give instruction from the book of nature, are as much worshippers of God, as much teachers of God's truths and as usefully employed as those who teach from the written record. When the geologist looks upon the footprints in the sandstone of the Connecticut

valley, he finds traces of God's works, and worships Him, as He should be worshipped, in spirit and in truth.

Dr. BUCKINGHAM. — It is said in Scripture, "Who can find out God by reasoning?" And we have evidence that men who have been great in material investigations have a very small knowledge in spiritual investigations. I know this cry has been raised and will be raised. We have had great men, like Voltaire, who denied a God. We have had a Humboldt, of whom it was doubtful whether he recognized a God at all. We have had Tom Paine, who was still worse. I shall not undertake to answer that question. I know the church has been bigoted, and I know the church has been jealous of her prerogatives; but I still know that there are other men who are turning everything into materialism, and acknowledge no God at all. Now, if we had sixty-three or sixty-four different elements and only one force, it would be rather strange. I think it strange that we should have only one force, and so many different elements. If this theory should be correct, we must step out at once beyond the region of our books.

Dr. ATKINSON. — I wish to take exception to what has been said by Dr. Watt, that the crab went on growing in the same ratio with all the rest of its body, except the new arm. If so, this is a half truth, and a half truth is the biggest lie you can tell. I was going to say happen, but there is no such thing as happen; and he who knows anything, knows there is a great first cause. I have been earnestly desiring, in interrogating nature for many years, to learn how she knows when she has things large enough: how she knows how to perform upon each material, so as to construct the various creatures that compose the animal kingdom. I take exception to any man's honesty, or his faithfulness, when his observations bring him to the conclusions here stated. What does the law, and what does the observation of every honest naturalist prove? It proves that when any of

these creatures are organized upon a plan so low as to be able to make a new organ, that every other thing is in abeyance until this organ shall be formed. The moth family is familiar to you all. It has different phases until it grows to its angelhood, and, being ready to propagate its species, gives up the ghost. We have the example of the egg being laid, and hatched by the rays of old Sol. No force can accomplish this but just so much of that which comes from the great central force. Then you say it is organized, and the animal can seize from the material world the elements necessary, and build them up into an organism that is specially qualified for its own individual existence. Now, if you can take the law of development, and look at it for yourselves, you will see it cannot accomplish this. Take a polliwig or tadpole, that is, an embryo frog. After it comes to its full development, and has lungs, it no longer breathes through the gill formation, but breathes the air direct, just as we are trying to do here; but let me say this has no reference to lapse of time. You can keep a polliwig twenty-five years if you will put it where it is deprived of sunlight, — even gas-light would affect it. Take that young frog, and you will notice that he puts out first his hind legs, and when he does that he can hop a little. At this stage, we will cut off his tail, and his legs will cease to grow until his tail is complete. In every case I have known, the arms have remained in *statu quo* until the tail was developed.

Dr. Watt. — I rise to a personal explanation which will not take two minutes. If I have been guilty of stating half truth, and half falsehood to the Association, I have been verily guilty concerning my brother.

Now, if I did convey the idea that the crawfish, or crab, is just as healthy an animal, and will thrive as well, with the amputation of one of its members, I did not intend it. I do say, and have demonstrated, that the crawfish or crab will increase in length, diameter, and weight, while that limb is growing, so that to overtake the other limb, the new limb has

to be larger than the one you amputated. That I have tested by experiment — by measurement. If the authorities are against me, why, it is all the worse for the authorities, that is all.

But, Mr. President, I do not dispute the fact, that the tadpole in its progress to the frog, will be arrested in its progress. But I have watched the fresh-water lobsters, and I am not aware that they are filling the position of turning into frogs. I have also a boy in my mind now, who is recovering from an amputation of the arm, and he is growing very rapidly. I am aware that he is not growing as rapidly, as if he had not that drain upon the system, and other circumstances were equal. I take it for granted, that the lobster will not grow as rapidly, because its health is interfered with, and there is an excess of material required to fill the spirit sack. I am, however, sorry that the illustration which I suggested, to see whether there was a mould to which each tooth should grow, has taken up so much of the time of this meeting, and I apologize to the Convention for it.

Dr. FULLER, of Chicago. — I am in hopes that as far as physiology may be discussed, it may have relation to the human system, and to the production of healthy organisms, such as come properly before this body. I do not believe it is the province of this body, to take up the physiology of other animals not coming before us for discussion. I am in hopes that the discussion may be confined to the science of dentistry, and other sciences bearing upon the development of that science.

Dr. BUCKINGHAM then read a paper on the *Development and Reproduction of Animal Tissues.*

Dr. ATKINSON — taking up the reference made in Dr. Buckingham's paper to the birth of the queen bee — said: Let us take out the partitions between five cells, so as to make Royal cells. All the officers in the hive go to work and then prepare what is called Royal Jelly — food only fitted for the higher animals. How do they produce Royalty? How are they Governors? They have no progeny. They have, however, confidence in their

instinctive inspiration, by their feeding Royal Jelly to some member. They deposit in the Royol cells an egg in each, and then they hover about it until they have brought about that peculiar condition which hatches out of the egg a little worm. I can tell you how that Royal Jelly is developed, but it is not necessary.

I have now told you how the bees obtained that which they desired, in the hatching-out that worm. They then feed the larve, until it wants no more feeding. Then they seal it over with a modified form of wax, and after due lapse of time these queens hatch out. They begin to give a peculiar sound with their wings; and the first one that hatches, emerges and sounds a note of defiance, and at once makes a survey. If another queen is hatched, then she sounds the note of defiance, and they fight, and one is slain. Then she bruises and tears the remaining unborn sovereigns. That is what all our sovereigns would have done if they could. This is a short synopsis of how she fights for her existence, and it is a triumphant proof of what I said about existence coming *de novo*, so far as eggs and cells are concerned. If the feeding of jelly had been neglected, they would every one have been workers, and had no queens at all.

What is periosteum? *Peri*, around, and *osteon*, a bone. We seem to be in the midst of misapprehension. Let us go back and rid ourselves of all the fog and nonsense which has kept us away from the truth of this matter. What is this periosteum? It is simply connective tissue or cellular tissue. It is that peculiar structure which is called periosteum by the learned across the water. Is that periosteum able to make a bone, and that bone a periosteum?

After some further discussion on this subject between Drs. Atkinson and Buckingham, and some announcements by the committee of arrangements, the Association adjourned until seven o'clock in the evening.

THIRD DAY.—Morning Session.

The first business was the selection of a place at which to hold the next annual meeting.

Dr. CHESEBROUGH proposed the City of Boston.

Dr. STONE named Louisville, Kentucky.

Dr. J. A. PERKINS named Portsmouth, New Hampshire.

Dr. SHEPARD advocated the selection of Boston, claiming that in the election of last year, Boston stood next upon the list to Chicago, and there was a tacit understanding that Boston should be selected as the next place for holding the Association. It had been said that if the West obtained the Association, having the power it would keep it. He had too much confidence in the generosity of Western men to believe it. In the large cities they could enjoy the benefits of the newspaper reports as they had here, and he was free to say that the admirable manner in which their proceedings had been reported by the press excited universal commendation. The interests of the Association would be materially enhanced by going to Boston.

Dr. STONE followed in advocacy of Louisville, but if the Association went to Boston he would gladly go with it.

Dr. MORGAN, of Nashville, while he favored Louisville, felt like Ruth of old; whither the Association went, he would go.

Dr. MCQUILLEN advocated the claims of Boston last year because he then thought the "hub of the universe" needed attention in relation to dental association; within the past two months, however, he had visited that region, and been present at the meeting of a number of dental societies, and he was happy to bear testimony to the fact that the profession in New England was aroused to the necessity and importance of associated effort, and nowhere more than in Boston. He therefore now advocated going to that city with a view of encouraging and extending this good work; he also considered that the many points of interest there presented — Prof. Agassiz's Mu-

seum, Harvard University, the Public Libraries, Bunker Hill Monument, etc. — were so many places where the members would reap valuable information and derive much pleasure.

Dr. J. W. Ellis thought it would be better to go to a cool city on the sea, than to meet in one of the hot interior cities like Chicago. He was in favor of Boston.

Dr. Horne, speaking for the New York and Brooklyn Dental Societies, which had a membership of over a hundred, set forth the advantages to the Association and profession at large, of meeting in cities which had the advantages of first-rate newspapers, to place their transactions before the whole country. He appealed to the courtesy and generosity of the Western members, who formed the great majority of the Association present, to make Boston the place of the next annual meeting.

On the first ballot the City of Boston was chosen as the place for the next session of the Association.

Dr. Kulp. — I proposed an amendment to the Constitution last year. I now beg to withdraw it. My proposed amendment was to strike out that part which says delegates shall belong to Dental Societies of the United States. My object was to allow them to come from Canada.

Dr. Ellis. I object to its being withdrawn. I want to see the amendment adopted. It seems to me that our Canadian brethren are near enough to us to be entitled to a seat; and, if we do not want them, let us say so publicly, by our vote.

Dr. Fitch. — I move that Dr. Kulp be allowed to withdraw his amendment. While I have a fraternity of feeling for the United States, and all the world besides, I am opposed to mingling up with other nations in that which appertains only to ourselves. Let them form their own associations. I hope, most earnestly, that the proposed alteration will be voted down.

Dr. Atkinson. — I am surprised that we should come to practice this very persecution of which we have complained. Is science not as broad as the race, and as broad as its institutions?

I do hope this resolution will not be withdrawn. We claim to be a scientific body: let us show that our sympathies are as broad as humanity; that we are willing to let all partake. Freely having received, let us freely extend to others all that belongs to the science.

Dr. CLARK. — I have recently travelled through Canada, and called upon dentists in the principal cities. I found most of them from the United States, and intelligent men. They have formed societies of their own, and are now desirous of forming more. They made complaint that they were not entitled to representation here. They belong to America. The same objection may be urged to the section in which I live. I hope this Association will admit all those from Canada.

Dr. FITCH. — I have not the slighest objection to receive delegates from Canada on the same basis as other societies allow them. They will be allowed to send delegates, without being recognized as working, active members, having the privilege of voting. I have no objection to grant them the privilege of honorary members, but not admitting them to membership. No other scientific body admits these foreign delegates as working, voting members.

Dr. BERRY, of Cincinnati. — I move that the delegates from Canada be permitted to come in, but not as working members.

Dr. MCQUILLEN. — When this matter was presented, last year, I regarded the proposed modification with favor; and wrote to a prominent professional friend in England, Mr. Edwin Saunders, President of the Odontological Society of Great Britain, directing attention to this fact, and stating that we should be pleased to receive and welcome any of our English brethren who might be sent as delegates from local societies. In a very courteous letter he stated that there was no probability of such a result. Under these circumstances I am disposed to let the constitution remain as it is, until a decided disposition is manifested on the part of the profession in foreign countries to send delegates to

this body. When they do so, it will be time for the American Dental Association, as a representative organization, to make arrangements to receive them. The gentlemen here from Canada, I am informed, do not present themselves in that capacity, for there are no local dental societies established as yet in that province. In conclusion, I fully recognize that science is as broad as humanity; but I also believe that the cultivation of science on the part of scientific men of separate nationalities has a stimulating influence, and accelerates rather than retards scientific investigation.

Dr. JOHN ALLEN. — If admitted here, I hope they will be admitted as working members, because I believe they will be capable of imparting valuable information. I do not think we ought to make this a sectional thing.

Dr. BERRY. — The proposition is to admit them. We have sent invitations to them over the water, and they say they sympathize with us; but their constitution is in the way. Cannot they alter theirs as well as we alter ours? So far as the Canadas are concerned, I would like them to come in, if they please; but if they say they have a constitution in the way, that is their look out.

Dr. KULP. — The reason I wished to withdraw that motion, was that I expected this discussion, and desired to avoid it.

The question being put on the adoption of Dr. Kulp's amendment, it was lost by a large majority.

AFTERNOON. — Third Day.

Dr. BUCKINGHAM read a paper by Dr. George T. Barker, on symmetrical diseases of the dental organs.

Dr. MCQUILLEN followed with the citation of a case of a Union soldier, wounded in the battle of Cold Harbor, one of the battles near Richmond, by a fragment of shell, which carried away a portion of the under jaw and most of his teeth, leaving a V-shaped fissure in the upper lip, while the remains of the

lower lip had fallen into the mouth and become adherent to the jaw and tongue. He narrated the attendant circumstances, and the treatment he had adopted after the patient had been deprived of speech, and when respiration and deglutition were exceedingly difficult, and mucus, pus, and saliva flowed coustantly from his mouth and beyond his control. The case was a novel one and the mode of treatment excited deep attention. Photographs of the patient before and after the surgical operations which the doctor had performed were presented.

Dr. CHESEBROUGH. — I have to present for examination the superior and inferior maxilla of the human species, during interuterine life, in the formation of the bone at the time that it had advanced in the smallest of these specimens; as near as I can gather, the age of the fœtus was about seven or eight weeks. The papillæ of the teeth are very distinctly seen at that time. I have them arranged on this watch glass, and the smaller ones I will pass round, in order that they may be seen; and it can be comprehended, with the aid of a microscope, at a glance.

In examining the superior maxilla which I have in my hand, — you see the size of it — it is hardly, in its most extreme width, half an inch, taking in the intermaxillary bones. The line between the maxilla and the intermaxillary bones, in the smaller specimen, is not distinct; in the larger one it is perfectly so, and you can see the difference between the formation of seven or eight weeks and that of five or six months. In the inferior maxilla, you will find that it is in two parts, partially united. In examining this, you will see two fibres passing in towards the centre. In the larger specimen of the inferior maxilla, you will find that I have removed the inferior maxillary nerve, and left that open. The central and lateral teeth in both these specimens occupy one chamber: there is no partition or alveolar wall between them. The cuspid occupies a position by itself, with a wall between it and the lateral incisor, and another wall separating it from the first molar. The first and

second molars occupy the same space, — there is no division between them, but you could very easily see a bony matter which could be thrown out to form a wall. In the inferior maxilla, by getting a right light upon it, the cuspids can be very easily seen; and in the superior maxilla the incisor teeth are very easily seen, they being nearly the size of life. These specimens, being out of the liquor in which I have kept them, are very easily shrivelled, and I will pass them round at once. If the subject affords you the satisfaction it has done me, you will find them very interesting. I very much regret that my collection of the ages between these two specimens were very carelessly destroyed. I had them preserved in alcohol, and in removing from Cincinnati they were accidentally destroyed.

Dr. Atkinson. — Perhaps this is the only time there will be an opportunity of speaking of our connection with the surgical and medical profession. Everything like respect for our fellows in that field it is absolutely incumbent for us to exercise, as far as possible, and the earnestness with which dentists have pursued their calling in the observation of cases has brought within the purview of their vision, cases which have enabled them more immediately to diagnosticate fracture of the inferior and superior maxillary bones than even the best surgeons. There is another thing in relation to that, which I would be very glad to present to the entire medical world, as it is very desirable that surgeons shall know the process of reproduction of bones.

In explaining a generally stated thing, before we see cases, we obtain a greater or less insight into it, and our apprehension is better awakened by specific cases. Some five or six cases of fractures of the inferior maxillary bone have come under my observation, which had not been discovered to be such for months after. One very prominent case was produced by a dentist, who removed ten teeth from the inferior maxilla of the patient; the latter felt a great deal of pain, but went home assured by the dentist that all was right. He continued, how-

ever, to suffer, with considerable inflammation and swelling of the surrounding soft parts. About eight months from the time he had been injured, I was consulted in relation to the case. It was quite evident that he had a comminuted fracture, and had discharged several pieces of necrosed bone. One side was fractured between the first and second molar, running back to the angle of the jaw. I removed the remaining portion of necrosed bone on the left side, and I have great hopes that he will ultimately recover, and have a new maxilla.

A dentist had been called upon to fill a right inferior second bicuspid. It was said to have been done very nicely, but periostitis supervened. A surgeon was sent for, and succeeded in getting up, by warm poultices, a very fine inflammation around the tooth, that eventuated in the exfoliation of the external alveolar process, from the right inferior first molar to the left inferior canine.

At the time of the highest inflammation, it so happened that I was invited to see her, and said at once, "This has been a case of warm poulticing." I would here say that you are never to use warm applications of any kind in inflammation of the periosteum. Your applications must always be cold, because you want to prevent or drive the inflammation away; make compresses upon the part; never make warm applications. This case has progressed marvellously. The whole of the teeth could be swayed backwards and forwards with the same ease as you have seen in cases of extreme salivation, where the teeth could be picked out. What is the cause of this? Simply, that the lime-salts are dissolved out of the animal matrix of the bones, and thus leaving a leathery mass. But, if the individual is properly fed, and properly treated mechanically, so as to hold the teeth in position, when nature shall present the nutrient materials, you will have the true bones again. I saw her last Friday, and the teeth were solid on the right side, except the canine, which was a little loose. That case was treated by cold applications, and constitutional means, the principal of which was, to begin with, heroic doses of

iodide of potassium, — eight grains three times a day. I have given twenty-four grains three times a day, and never have seen the hobgoblins that are heard of.

I think it will be acknowledged that we cannot now confine ourselves exclusively to the teeth. Let us first lay deep and broad the foundations upon which to build the intelligence necessary for us to pronounce ourselves, so as to stand respectably with the wise men of medicine, and then you will find that there will be unanimity.

One or two words as to periostitis. What is it? It means inflammation. How shall we distinguish this action? The stage that we first perceive is called irritation; then there is the stage of congestion, and the stage of exudation; and were we sufficiently educated, we could see where the irritation first pronounced itself, — whether at the root or elsewhere. Then we should go carefully and deliberately, yet kindly and resolutely, to work down at the small point where the evil begins, and exorcise it at once.

What is the mode of treatment? Make six or eight incisions, so that you can be sure you have got this little evil genius out of the way.

Dr. SHEFFIELD. — I exhibit to you necrosed portions of a jawbone, which I took from a child six years of age, that had been poulticed for an abscess of the temporary molar. After their removal the child recovered from the difficulty.

Dr. MORGAN. — A year since, a child, about four and a half years of age, was sent to my office by Prof. Winston, of the University of Nashville, with some trouble in the inside of the inferior maxilla. I learned from him that he had been called in about six weeks previous to that day, and found the child suffering from febrile action, superinduced by toothache. It had commenced as toothache, in one of the molars. The mother applied poultices on the face, and in two days the child had a fever. When the case came into my hands there was considerable in-

flammation in the soft parts, and, on examining the jaw, I found a considerable portion of the bone necrosed. I removed the offending tooth along with the necrosed alveolus. The germ of the permanent tooth came away with it. The warm fomentations, applied to the face, were the cause of the evil. [Cheers.]

Dr. FREEMAN. — I have had one case of experience of these poultices. One of our city physicians was called to attend a lady with an inflamed tooth, and he recommended a poultice to her face. A large abscess formed, and this young, married lady has now a permanent deformity of her face. This abscess had continued for three or four weeks before I saw it. I informed her husband that the bone was necrosed. The attention of the physician was directed to that fact, and a sequestrum was removed. I have seen two other cases of necrosis of the maxilla caused by warm poultices.

Dr. ATKINSON. — I hear many of you say exposed nerves, when you mean exposed pulps. Now, there are not only sensory nerves, but also blood vessels, and connective tissue in the pulp. A number of us have cut off the ends of pulps, and had them bleed freely, and heal kindly. Our experiments have carried us through a serious state of practice, and Philadelphia has taken it upon herself to say that when the dentinal pulp is exposed, or nearly exposed, death is the inevitable result. Some practitioners have had the audacity to question that. They say that if it was only a mechanical wound, there was no reason why it should not re-unite. Well, I tested the matter with varied success, sometimes getting over it, and sometimes not; sometimes getting secondary dentine, and sometimes not; sometimes pulps died. Dr. Allport takes out a portion of the pulp, in such a manner as to form flaps, which unite, and then, without any cap whatever, fills the tooth.

Dr. PERKINS, of Albany. — I was, either fortunately or unfortunately, drawn into this current sometime since. My attention was drawn into it by attempting to insert a pivot tooth in a fang.

I went to work without any hesitation to drill the fang for that pivot. I got down a distance of a line, or perhaps two lines; the patient said, "You hurt me." I replied, "Why, that is a dead tooth." "No matter, you hurt me," he said. "Very well; let us try again." I did so, with the same result, and stopped at that, thinking there was something that I was not prepared for; and, taking out the drill, blood flowed from the cavity. That led me to think that if such cases occur once, why should they not occur again and again? I have repeated my efforts since then to preserve living pulps in that condition. I sometimes find a little point exposed, and I think it is too bad to destroy a tooth as healthy as that, and I have saved a good many teeth where that has been the case. I have not removed the fillings to see what the result has been; but I have never, in any instance, heard from these teeth since. They serve the people well, and they have not complained about them. My idea is, however, that these teeth die a sort of natural death, and do not cause any great commotion.

Dr. Stone. — I have been treating dental pulps for many years, and trying to find out the vitality they contain, after being exposed. In the section of the country where I am, they cannot retain the vitality they appear to enjoy in this part of the country. In the first place, when I commenced treating exposed pulps, I used to cap them, and apply astringents, and such preparations as were then recommended by the profession; and we endeavored, in every way, to save them, by cutting a portion of the pulp away, my experience has been, that, there is no such thing as retaining a pulp, — after you wound it, and cause it to bleed — I never have seen a case, where there was a deposit of bone, and the pulp got well. I have filled teeth in which the pulps were exposed, and by being careful with them, and the patients health being good, the teeth gave no inconvenience for three or four years; but sooner or later there would be indications of decay, periostitis and alveolar abscess.

Dr. C. R. Butler. — I have had some experience in this matter; I believe we have some difficulty in saving pulps in bicuspids, in any attempt at excising a portion of them, or in any other mode of treatment, whether they be inferior or superior. The reason for that, which I assign, is, that the pulp chamber is large with a considerable amount of pulp. It is easily exposed, and we may excise a portion of it, and I have had less success with those cases than with other teeth.

Now, if I cut off one of my fingers, of course I cut off soft tissue. No one will question that it will not heal under favorable circumstances.

Why not, if we cut off the exposed portion of the pulp, it being in a healthy condition — no inflammatory action at the time — why will it not heal? It is claimed that wounds will heal by immediate union. Why is that? The plastic lymph is thrown out, and it so perfectly seals it together that we have the happiest resolution. Now, in excising the pulp, leave out all these tinkering processes of gathering it up and capping it, and all these other applications that are sure to irritate it. Let the lymph protect it; and, after all your very delicate manipulation, if you do not succeed, then cut it away, or put in something that will produce destruction instead of irritation.

In cases of alveolar abscess, as they are termed, there is a great deal of difficulty in curing them, even after the fang of the tooth has been well plugged; but in these cases it is admitted that it is from the death of a portion of the bone. Now, I have found it better to cut through the gum, and take a scooping instrument, or anything by which I can reach the necrosed portion of bone, and take it away. We thus get rid of that long, tedious process which used to be gone through with to cure alveolar abscess. It is simply a little surgical process, and works better than the old mode of practice.

Dr. Stone. — Some five years ago I treated a tooth in this manner. The tooth was strong and of good character, with no

discoloration; but there was an alveolar abscess, which had been discharging for many years. In the first place, I cleared the pulp cavity of all foreign substances, and then trephined the alveolus opposite the apex of the root, and by means of a syringe injected creosote into the pulp cavity. I treated it in that way for some four or five days, until the flow of pus ceased. After getting the tooth in a healthy condition, with no soreness, I filled it, and it is now a useful organ.

Here is another fact about diseased teeth. My friend says that the bicuspids are the hardest teeth to treat when the pulps are exposed. This is owing to the fact that the roots are flat, and the canals correspond with the external shape, and it takes a good deal of time to get the pulp out; but we all agree it can be done. I hold it as a principle, that we must extract every portion of the pulp; and then you fill that tooth, and you have accomplished an end which will last.

Dr. FORBES. — Is it owing to the treatment of the tooth, or is it owing to the idiosyncrasy of the patient, that the pulp in one case is preserved, while in another it is lost? When we are talking about practical knowledges, — it is the only manner in which this subject should be treated, — we should confine ourselves to the practical. I have saved many teeth in the way spoken of, and have lost many a tooth after having filled it, and found it die. The color of the tooth has not pleased me. I take out the filling and the dead pulp, improve the color of the tooth, and fill it again. It is guess-work with me. I cannot see down into the roots. Now I want gentlemen to tell us wherein they have failed. We can learn as much by our failures as we can do by our successes.

Dr. F. Y. CLARKE then read a paper on "Diseases of the Dental Pulp, and their Treatment."

The Association then adjourned until eight o'clock in the evening, at which time, Dr. MCQUILLEN delivered a lecture upon the "Circulation of the Blood," with special reference to the teeth.

The lecture was illustrated by showing the capillary circulation in the web of a frog's foot, under the microscope, and also by the performance of a vivisection on a frog, whose heart continued to pulsate long after decapitation and the opening of the thorax of the animal. One of the main efforts of the speaker was directed to the treatment in cases of hemorrhage from the extraction of teeth, and to prove that instances of "bleeding to death" were inexcusable, as they could be prevented by timely precautions.

Dr. PERKINS, of Milwaukie. — I think Dr. McQuillen was too decided in his assertion that death from hemorrhage attendant upon the extraction of the teeth is not only inexcusable, but culpable. I believe that instances may occur in which an operator should not be held accountable for unfortunate results; and in support of this, recall two cases which came near proving fatal. I would ask what should be done in cases where all local applications proved unavailing?

Dr. MCQUILLEN. Fully recognizing the fact, that persons laboring under the hemorrhagic diathesis are liable to the most profuse and alarming hemorrhage from the slightest injuries, and that, in such cases, trouble is to be apprehended in the extraction of teeth; still, taking into consideration the facility with which compresses can be applied over the bleeding surface, and retained immovably in their place by a proper bandage passing under the jaws and over the top of the head, and the hemorrhage thus controlled, I can but reiterate that which I have already uttered. In cases where such efforts might fail, the ligation of the primitive carotid, in the middle triangle of the neck, would completely arrest the hemorrhage. For my part I could wish most earnestly that every dentist was fully prepared to meet just such emergencies, but until they all are, those who are not, must rely upon the surgeon.

After the delivery of the address, the Association adjourned to Dr. Davis's residence, and to meet in convention at the usual hour the next morning.

FOURTH DAY. — Morning Session.

Operative Dentistry was taken up as the subject of discussion.

Dr. PEEBLES. — I want to acknowledge my faults, and have my brothers set me right. People come to me oft-times with teeth that are diseased — young subjects, six years old — molars, for instance; and I want to save these teeth. To show you what I mean, I will mention the difficulty I have of getting down into the fangs of the lower molars, and getting out all the pulp and filling it successfully, so that it turns out to be a success. I have great difficulty with the anterior fangs. I cannot get my instruments down so as to bring out that pulp.

Dr. ELLIS. — It may perhaps be attributed to my want of scientific knowledge that I regard operative dentistry as the most important part of our profession. Now, I want to know something of these things. This morning, I have been unfortunate enough to have to take the forceps to a molar filled some weeks ago, after having treated it as well as I could, and removed the pulp as thoroughly as possible. I want to know if gentlemen can tell us of any possible way of always being successful in treating these cases — I mean of destroying and removing the pulp, filling the roots, and being invariably successful. I like to see a dentist build up the crown of a molar tooth, and restore it to its exact natural shape, and make it serviceable; but I have not yet been able, in all my practice, to be invariably successful in making them serviceable; and I am afraid we are rushing into the error of performing this kind of fancy operations for the purpose of *éclat* — for the purpose of advertising. If we can get a chance to build out a central incisor in a beautiful young lady, we like to have it, because when she smiles it is very pretty indeed to us. If we can do these operations, and make the teeth permanent, well and good. But, rather than fail in making a useful tooth, I would fill it just out even to the edge of the enamel, and let one corner be gone.

Dr. FITCH. — We must remember that we are operating on the human organism, and the tooth is under the laws governing living tissue as much as any other part of the system, and we must also remember that we are operating upon organisms that are ever changing. We do not find two individuals with the same diathesis. Therefore we must not expect to be invariably successful, any more than a surgeon or a physician would be. When we take these facts into consideration, we must not be at all surprised if we are occasionally disappointed, because we are unable to control circumstances. We may medicate, but we have not always the power to reach the object of our medication. The tooth is a little lower in vitality than other portions of the human frame. Now, if a patient comes to me with a constitution that is very much broken down, the system in a debilitated condition, the blood pauperized, I dare not put upon that patient the strain which I would upon one having a vigorous and healthy constitution. I have something to do here, to rectify the crasis of the blood column. I may plug a tooth without an exposure of the pulp, and meet with success, but the very moment I come upon this highly-sensitive tissue, I may bring into existence difficulttes which cannot be arrested.

Now, we have to recognize these absolute medical principles in the treatment of all these cases. When a patient comes to us we must judge what is the best course to pursue; and if we cannot have the treatment and the control of that case, I would say frankly, "I do not know that I shall be successful in your case: I would therefore prefer not to undertake it." In my practice I have to choose between two evils. If I come across a person of full plethoric habit, why, there I would have a difficulty; the liver will be slow, and I have there to guard against bad results. But when I see an individual that I think is all right, and equally balanced in the integrative and disintegrative acts, with good liver, good digestion, — then I make my observations. First remove all the morbid matter; that is the

broad law of surgical treatment. I would take the pulp out alive, as far as possible. That is, I would not destroy the pulp. It is better to take the pulp out with anæsthetics than with arsenic. The question comes, have I removed all this pulp from these roots? If I have not done it, what is the next? My next step is to introduce something that will stay its action right there. What do you use to preserve meat? Creosote. It will not go any further if you saturate it thoroughly with creosote, and creosote is always kindly upon the nerve. Then take a piece of cotton, saturate it with creosote, force the excess out, and introduce that cotton down as far as I can get it. A tooth filled with cotton saturated with creosote, is just as good a filling as you can have in a tooth any way. You may remove that cotton twelve years after, and you will find it is perfectly sweet.

Dr. Horne. — From what the gentleman says, it might be supposed that he would fill the tooth with cotton. I think he meant the root only.

Dr. Fitch. — The root only, I meant.

Dr. Stone. — I was not aware that there was a gentleman in the profession that *trephined* every nerve, except myself. That shows me that there is something in use which we do not all know, and which we should try to get out this morning. Some two or three years ago, I commenced that principle. I used not a drill, because that makes the bone rugged; but I had a small instrument, made hollow. I saw one yesterday that was better than any that I have had. When a tooth becomes diseased, after it is filled to the apex of the root, I always make an incision down to the root, scraping it out and polishing it and rounding it, and leaving the rest to nature. Gentlemen want something to enlighten them on the subject of treating diseased teeth, after the nerves have died. The doctor says, and I say so too, that it is very important to remove all foreign substance that is in and around the tooth. There are some persons I would not treat a tooth for at all; the persons who are not cleanly with

their teeth, and who never come unless they are driven to you by the toothache, sacrificing one tooth to save others. That is all they can appreciate.

Dr. KENNICOTT. — I am a great enemy to the instrument called "forceps," and could I have *my* way, would banish both the forceps and the file from the profession. I was astonished yesterday, in listening to the discussions, to hear gentlemen advocate the destruction of a large class of teeth, and telling the young folks here that they had better not meddle with them, lest they should lose their reputations.

I tell you, gentlemen, there is a vital principle involved in this thing, of preserving every tooth, that in a healthy condition could be made useful, and I hold that our duty is not fully performed until each offending tooth has had a fair trial for its life. The duty of the dentist toward his patient is as apparent and as binding as that of the general surgeon. Suppose a surgeon is called to treat a case of a fractured limb. He examines the case and makes up his mind that the patient will die unless it is amputated. He examines the pocket nerve, and finds it will not pay, and he declines to operate. Is that man doing right? or should we be right in following his example? Let us see.

My friend here is called upon to treat a tooth, where the pulp is exposed, the walls of the cavity are thin. The patient may not be very wealthy, or influential. In consideration of these circumstances, he makes up his mind that it will not pay. Although he knows, in his heart, that he can save the tooth, he takes the forceps and pulls it out, with the consoling remark that it will trouble the man no further.

Is that the duty of the dentist? I believe, in fact I know, that in forty-five cases out of fifty, the exposed pulp, if properly treated, and the tooth well filled, can be saved. There is no question about it. The only question is the practical one of how to do it. In the discussion, yesterday, it was conceded that this class of teeth had better be sacrificed, better be extracted at

once, because a great many of them would fail even if treated in the best possible manner. I must decidedly dissent from this decision.

I wish to illustrate my position by stating my practice in these cases. When I meet with this class of teeth with the pulp exposed, whether of recent or long standing, — inflammation existing, perhaps, of both the *periosteum* and lining membrane, I may not be able to say that I can surely save that tooth, but I believe it to be my duty to try, and I begin by reducing the inflammation in this way. I cleanse the tooth from the decayed matter and impurities, and introduce a preparation composed of *creosote*, *morphia* and *aconitin*. Upon this last I depended almost entirely in these difficult cases. The way in which this medicine operates I believe to be about the same as if you gave the patient an *anæsthetic*, and then proceeded to perform a surgical operation.

If you find it necessary to destroy the nerve, add to your mixture *arsenious acid*. The one will paralyze the nerve, while the other does the work of destruction.

Dr. RICHARDSON. — Have you to take any unusual caution in closing the cavity?

Dr. KENNICOTT. — I invariably cement it in by having the surrounding portion of the tooth dry, and melting on a cement of wax and resin.

Dr. MORGAN. — Do you hold to the idea that after the pulp is paralyzed, absorption of the *arsenic* goes on?

Dr. KENNICOTT. — That is a question of theory, and now I am on a question of practice. I have my private opinion, however, and that is, that it *is* absorbed.

To return to this subject of inflammation of the pulp. In some cases there may be periosteal inflammation requiring constitutional treatment. A medical friend of mine said to me one day, "this matter of inflammation is nothing more nor less than fever; now in cases of fever we are in the habit of using *veratria*." I took

the hint and tried it, and with the most gratifying results. I do not rely upon *veratrum* alone in these cases, but use it merely to control the inflammation, as I use *aconitin* to paralyze the nerve in destroying the pulp. But that alone will stop a case of tooth-ache in a few minutes. It should be used with a considerable degree of caution, and this *aconitin* also should be used with the utmost caution, and introduced carefully, and sealed tightly into the cavity.

Another class of cases is where there is simple exposure of the nerve. Now, though it has been pronounced clap-trap and humbug here, yet it is *my* practice to cap these nerves, and fill the teeth immediately; and I can show by the records of my office, that at least forty-five in fifty have been successful. I own that a case will sometimes occur where it has to be treated again, and, perhaps, the nerve destroyed. But where the capping has been carefully and skilfully performed, it will be successful. A great deal of the success will depend upon the condition of the pulp, and the manner in which the cap is placed over it. There must be no *vacuum* under it, and it must not rest upon any portion of the exposed nerve. I make my caps out of No. 28 gold plate, and of various sizes and shapes. These are made concave on one side by swaging. I pick out one which I think will fit, and put in the cavity of it a little lump of purified gutta-percha, which will melt at a very low temperature, and hold it over a lamp until it melts. Its tenacity will hold the cap to its place, and it takes the exact impression of the nerve itself, without compression. Thus the pulp is completely sealed up, and there is no place for the accumulation of lymph. Then you may fill the tooth, and use your mallet, if you please, without pain or inconvenience. If the operation be performed in this manner, it will succeed.

Dr. McQuillen. — I believe that all practitioners have their failures, those who claim to be immaculate to the contrary notwithstanding. The failures of first-class men, however, are so

slight in proportion to their successes that the former cannot be charged against them as the result of incapacity or carelessness, but are due, as a general thing, to circumstances over which they have no control. An average of success such as this is not the result of mere chance, but is due to a knowledge of, and a strict adherence to, principles; for, in dental operations, as in all other human efforts, there is an underlying basis of principles. I have a paper on "Dental Manipulations," which treats the subject in this light, and, if agreeable to the Association, would read it.

Permission having been granted, the paper was read.

At the conclusion of the paper, Dr. McQuillen said — My operations are performed entirely by hand pressure; and, although not desiring to be understood as opposing the use of the mallet on the part of those who feel that they cannot get along without it, I do object most emphatically to the strong terms of denunciation employed against those who succeed in obtaining perfect results without it. We are informed that teeth were never properly filled until the mallet was revived; but, when looking back upon the labors of Hudson, Townsend, Maynard, Neall, Dunning, Dwinell, and many others too numerous to mention, whose fillings were introduced by hand pressure, and, after a lapse of ten, fifteen, and thirty years, are found standing as perfect as the day they were finished, and when seeing a large portion of my own work performed within the past eighteen years presenting the same appearance, there is no just reason for changing a mode of practice, however much others might denounce it. We are told that patients do not object to the mallet when it is properly used; yet some patients who have submitted to the manipulations of its most earnest advocates and those most experienced in its use, say that, rather than submit to such torture as that which they had endured under its infliction, they would prefer to lose their teeth. As I have said in the paper, dental operations, at the best, can never be made

agreeable; but we should try to make them as easy as possible, consistent with securing perfect results. Again, if one person can succeed in saving a tooth by hand pressure in the same time that it takes two or more to do it with the mallet, there is that much gained for the assistants, who can be employed in doing something else. Lastly, the presence of third parties is exceedingly objectionable to some patients, and the necessity of observing a just regard for their wishes in that direction must be evident to every man possessed of a proper sense of the rights of others. I should not have expressed myself thus freely on this subject (for I have no disposition to controvert the practice of others, when they succeed in obtaining favorable results) but for the strong terms of denunciation that have been constantly indulged in towards those who, succeeding without the mallet, do not think it necessary to adopt its use.

Dr. ATKINSON. — I have long maintained that gold is capable of being welded at a low temperature. In illustration, I here exhibit a wire of pure gold, very ductile, of about eighteen inches in length. Dr. A. Lawrence, with ordinary soft foil, made a finger-ring of layers laid round the handle of an instrument, and condensed with serrated instruments; the ring was worn for a time, and then, to carry the experiment still further, was hammered down, and passed through a wire plate. Dr. Lawrence's amalgam, if used as he directs, with the cavity prepared as it should be, would last for ten lifetimes. I do not advocate the use of amalgam, but consider the material of less consequence than the manner of its use. Wherever there is a difference of opinion on matters which are demonstrable, it is because there there is a difference in the degree of intelligence.

In reference to the use of hand pressure *versus* the mallet, the doctor extolled the latter at the expense of the former, and characterized the objectors to spectators of office operations as men who loved darkness better than light, because their deeds were evil.

Dr. PERKINS strongly denounced Dr. Atkinson's remarks as insulting to the assemblage.

Dr. MCQUILLEN, in response to Dr. Atkinson's last remark. — I would only quote the language of the gallant Prince who originated the motto and established the English Order of the Garter, "Honi soit qui mal y pense" — evil be to him who evil thinks.

Dr. A. HILL. — As a matter of course, varying results are obtained the world over. There are advantages in clinics which discussions could not afford.

Dr. MILLS. — I attribute failures almost entirely to imperfect manipulation, not to errors in theory. A very great improvement has been made in the manufacture of dental instruments, and this has a marked bearing on the perfection of operations on the teeth. The doctor read his views on the wedging of teeth from an article printed in one of the dental journals.

Dr. HORNE. — Permit me to direct attention to the utility of Dr. Barnum's application of pure sheet rubber for isolating a tooth from moisture during the operation of plugging. This consists in puncturing or cutting a small hole in a piece of the rubber, three or four inches square, to be forced over and around the tooth, with the edges turned upward to the gum; if the teeth are near together, other holes must be made so as to include the teeth on either side of the one to be filled. By this means the plug will be kept dry during an operation of several hours.

The Association adjourned to the usual hour in the afternoon.

This session and one in the evening was mainly occupied by business matters, which are referred to in the minutes of the Secretary.

TRANSACTIONS

OF THE

AMERICAN DENTAL ASSOCIATION.

SIXTH ANNUAL MEETING,

HELD AT

BOSTON, JULY 31st, 1866.

TRANSACTIONS

OF THE

AMERICAN DENTAL ASSOCIATION.

The Sixth Annual Meeting of the AMERICAN DENTAL ASSOCIATION was held in the Representatives' Hall, State House, Boston, July 31, 1866.

The meeting was called to order by the President, Dr. C. W. SPALDING, at 11 o'clock, A. M., when prayer was offered by Dr. A. A. COOK, of Milford, Mass.; after which, Dr. N. C. KEEP, of Boston, President of the Massachusetts Dental Society, delivered an Address of welcome, to the Association, in the name of that Society.

Dr. L. D. SHEPARD, of the Committee of Arrangements, presented their report on credentials as follows:

Your Committee would report that they have received and examined the credentials of the following persons, and find them to be properly authorized delegates to this Association:

Association of Clinical Lecturers of New York College of Dentistry. — Dr. W. B. Roberts.

Brooklyn Dental Association. — Drs. W. Jarvie, R. M. Streeter, J. B. Young, A. Y. Paddock, A. C. Hawes.

Connecticut State Dental Association. — Drs. F. T. Mercer, J. A. Pelton, A. E. Strong, R. W. Browne, J. M. Riggs, E. E. Crofoot, W. Allender, S. L. Geer, John Cody.

Connecticut Valley Dental Association. — Drs. J. Beals, A. F. Davenport, G. Bowers, E. V. N. Harwood, F. Searle, A. B. Cowan, J. F. Adams, S. G. Henry, A. A. Howland, C. S. Hurlbut, S. P. Martin, O. R. Post.

Central Massachusetts Dental Association. — Drs. S. P. Miller, J. McGregory, T. D. Chamberlain, O. C. White, C. W. Estabrook, Geo. L. Cooke, W. N. Snow.

Central States Dental Association. — Drs. B. F. Arrington, J. L. Nourse, W. H. Goddard.

Central New York Dental Association. — Dr. S. B. Palmer.

Chicago Dental Society. — Drs. J. W. Ellis, G. H. Cushing, J. A. Kennicott.

Cincinnati Dental College Association. — Dr. H. R. Smith.

Hudson Valley Dental Association. — Drs. C. H. Jenkins, A. H. Taylor, E. J. Young.

Indiana State Dental Association. — Drs. J. H. Jameson, W. F. Morrill.

Illinois State Dental Association. — Drs. O. Wilson, L. P. Haskell, M. S. Dean, E. Honsinger.

Lebanon Valley Dental Association. — Dr. S. H. Guilford.

Michigan Dental Association. — Drs. J. A. Harris, George L. Field, J. H. Warren, J. A. Robinson.

Massachusetts Dental Society. — Drs. A. A. Cook, O. F. Harris, E. G. Leech, T. B. Hitchcock, E. N. Harris, J. H. Batchelder, N. C. Keep, W. L. Bowdoin, S. J. McDougall, George T. Moffatt, J. M. Daly, E. C. Rolfe, S. F. Ham.

Merrimac Valley Dental Association. — Drs. G. W. Lawrence, C. Heath, J. Fiske, D. T. Porter, A. T. Johnson, D. K. Boutelle, L. F. Locke, J. H. Kidder.

New Haven Dental Association. — Dr. H. J. Stevens.

New York College of Dentistry. — Dr. J. S. Dodge, Jr.

Newark City Dental Society. — Dr. G. F. J. Colburn, W. G. Lord.

New Orleans Dental Society. — Dr. J. S. Knapp.

New York Society of Dental Surgeons. — Drs. I. W. Lyon, C. E. Latimer, J. C. Robbins, J. W. Cosad, Frank Abbott, N. W. Kingsley, A. L. Northup, J. A. Bishop, W. A. Bronson, George E. Hawes.

Nashville Dental Association. — Dr. W. H. Morgan.

Ohio State Dental Association. — Drs. C. R. Butler, W. P. Horton, B. T. Spellman, C. M. Kelsey.

Odontographic Society, of Pennsylvania. — Drs. J. L. Suesserott, A. B. Robbins.

Ohio Dental College Association. — Dr. W. W. Allport.

Pennsylvania Dental College. — Dr. T. L. Buckingham.

Pennsylvania Association of Dental Surgeons. — Drs. J. C. Greene, Amos West, S. Roberts, J. H. Githens, J. J. Griffith, G. T. Barker.

Philadelphia Dental College. — Dr. J. H. McQuillen.

Susquehanna Dental Association. — Dr. J. D. Wingate.

St. Louis Dental Association. — Dr. H. J. McKellops.

South Western New York Dental Society. — Drs. F. M. Briggs, J. C. Gifford.

Stratford County Dental Association. — Dr. C. M. Murphy.

Western New York Dental Society. — Drs. A. P. Southwick. Thos. G. Lewis.

Western Dental Society. — Dr. A. Blake.

Respectfully submitted.

B. S. CODMAN.
L. D. SHEPARD.
A. LAWRENCE.

Some exception was taken to that portion of the report having reference to the delegates from the Board of Clinical Lecturers of the New York Dental College.

On motion of Dr. MCKELLOPS:

Resolved, That so much of the report of the Committee on Credentials, as refers to a delegation from the Board of Clinical Lecturers, of the New York Dental College, be referred to a committee of three, who shall investigate, and report upon the same at the earliest possible period.

Committee, Drs. H. J. McKellops, Geo. Watt, W. C. Horne.

On motion of Dr. WETHERBEE:

Resolved, That the physicians and dentists, resident in this city, and any others who may be in Boston, during the sessions of this Association are hereby invited to be present, and take seats with this body.

The roll was now called, and the following permanent members answered the call:

W. H. Atkinson, Geo. S. Allan, W. H. Allen, John Allen, W. W. Allport, H. F. Bishop, C. R. Butler, Aaron Blake, G. T. Barker, E. A. Bogue, F. T. Chandler, F. Y. Clark, G. H. Cushing, B. S. Codman, E. G. Cummings, M. S. Dean, J. W. Ellis, I. Forbes, G. L. Field, C. E. Francis, C. P. Fitch, S. D. French, J. C. Gifford, G. A. Gerry, A. E. Gibbs, J. A. Harris, W. C. Horne, L. P. Haskell, Asa Hill, W. P. Horton, A. C. Hawes, W. B. Hurd, W. H. Jones, J. Knapp, A. Lawrence, T. G. Lewis, J. McManus, J. H. McQuillen, G. A. Mills, J. T. Metcalf, A. T. Metcalf, W. H. Morgan, J. L. Nourse, S. B. Palmer, C. Palmer, W. C. Parks, Spencer Roberts, Elias Strong, B. T. Spellman, A. P. Southwick, J. N. Scranton, C. W. Spalding, L. D. Shepard, W. W. Sheffield, I. A. Salmon, J. L. Suesserott, J. H. Smith, H. R. Smith, F. A. Seabury, A. P. Sayles, J. Taft, R. W. Varney, O. Wilson, George Watt, I. J. Wetherbee.

The following members were not present, but sent their dues:

N. W. Williams, J. B. Williams, A. A. Blount, S. G. Martin, C. H. Foreman, G. B. Fittz, W. K. Brenizer, H. E. Peebles, A. Berry.

The following new members also answered the call:

B. F. Arrington, Frank Abbott, Wm. Allender, Joseph Beals, F. M. Briggs, Geo. Bowers, W. L. Bowdoin, J. H. Batchelder, D. K. Boutelle. W. A. Bronson, J. A. Bishop, J. H. Cosad, A. B. Cowan, G. F. J. Colburn. E. E. Crofoot, G. L. Cooke, John Cody, T. D. Chamberlain, A. F. Davenport, J. S. Dodge, Jr., J. M. Daly, C. W. Estabrook, J. Fisk, J. C. Green, J. H. Githens, J. J. Griffith, S. H. Guilford, W. H. Goddard, S. L. Geer, O. F. Harris, E. N. Harris, Chester Heath, T. B. Hitchcock, E. V. N. Harwood, S. G. Henry, C. S. Hurlbut, S. F. Ham, E. Honsinger, Geo. E. Hawes, J. K. Jameson, C. H. Jenkins, N. Jarvie, Jr., A. T. Johnson, N. C. Keep, J. H. Kidder, N. W. Kingsley, C. M. Kelsey. J. S. Knapp, G. W. Lawrence, C. E. Latimer, I. W. Lyon, W. G. Lord, L. F. Locke, H. J. McKellops, W. F. Mor-

rill, J. McGregory, S. P. Miller, S. J. McDougall, F. T. Mercer, S. P. Martin, G. T. Moffatt, A. L. Northrop, O. R. Post, D. T. Porter, A. Y. Paddock, J. C. Robbins, J. M. Riggs, W. B. Roberts, E. C. Rolfe, J. A. Robinson, R. M. Streeter, H. J. Stevens, Elias Strong, F. Searle, W. N. Snow, A. H. Taylor, J. H. Warner, A. Wert, J. D. Wingate, O. C. White, E. J. Young, J. B. Young.

Resolved, That the President is hereby authorized and requested to appoint a committee, consisting of nine members, to select nominees from which to elect officers of this Association.

The following persons constitute that Committee: W. W. Allport, A. Hill, I. Forbes, C. R. Butler, W. H. Atkinson, W. H. Morgan, J. S. Knapp, T. L. Buckingham, A. Lawrence.

Dr. SHEPARD reported that the Committee of Arrangements would recommend the adoption of the following daily order of business:

Clinics, from 8.30 to 10, A. M.
Morning Session, 10, A. M., to 2.30, P. M.
Evening Session, 7.30, P. M., to 10.
After some discussion, adopted.

DR. SHEPARD, in behalf of the Massachusetts Dental Society, and the Dentists of New England, announced the following programme for outside entertainments, to which all the members were invited:

Wednesday, 12, M., to 1, P. M., concert with Great Organ in Music Hall.

Thursday, steamboat excursion down the Harbor; also invitations to the Museums of Prof. Agassiz and Dr. Warren.

The report of the Treasurer was now called for, which was presented, and is as follows:

I. J. Wetherbee in Account with the American Dental Association.

Dr.

July 25, 1865. — To cash received of 95 members ($4 each)		$380 00
" " To cash received of 31 members ($2 each)		62 00
" " To cash received of 3 absent members ($2 each)		6 00
		$448 00

Cr.

July 28. — By cash paid for hall		$80 00
" " " reporter		80 00
" " " Publication Committee		49 83
" " " for removing furniture		12 00
" " " " Treasurer's register		5 38
" " " " sundries		8 55
		$235 76
Balance		$212 24

A committee of three was appointed to audit the Treasurer's account.

Committee, G. A. Gerry, Geo. L. Field, Geo. H. Cushing.

On motion of Dr. Watt,

Resolved, that a committee of three be appointed to prepare and present at the present meeting for consideration and action, a code of ethics, for this Association.

Committee, Geo. Watt, John Allen, J. H. McQuillen.

Report of the Auditing Committee.

Your committee appointed to examine the accounts of the Treasurer, report that they have examined and compared the same with the vouchers, and find it to be correct.

Respectfully submitted.

G. A. Gerry.
Geo. L. Field.
Geo. H. Cushing.

The Association now took a recess of ten minutes, during the absence of the Committee on Nominations, after which the house was called to order, when the committee presented the following nominations.

President. — C. P. Fitch and A. Lawrence.
1*st Vice-President.* — W. H. Morgan and J. S. Knapp.
2*d Vice-President.* — G. T. Barker and L. D. Shepard.
Corresponding Secretary. — A. Hill and M. S. Dean.
Recording Secretary. — J. Taft and W. C. Horne.
Treasurer. — W. W. Sheffield and I. J. Wetherbee.

Upon balloting, the following persons were elected officers of the Association for the ensuing year, viz:

President. — C. P. Fitch, of New York City.
1*st Vice-President.* — W. H. Morgan, Nashville, Tenn.
2*d Vice-President.* — L. D. Shepard, Salem, Mass.
Corresponding Secretary. — A. Hill, of Norwalk, Ct.
Recording Secretary. — J. Taft, of Cincinnati, O.
Treasurer. — W. W. Sheffield, New London, Ct.
Association adjourned till 7½ o'clock, P. M.

FIRST DAY. — Evening Session.

The Association convened according to adjournment, President Spalding in the chair.

Minutes of the morning session were read and approved.

The committee appointed to examine the credentials of the delegates from the Board of Clinical Lecturers of the New York Dental College, made the following report:

The Special Committee, to whom was referred the credentials of the delegates from the Board of Clinical Lecturers of the New York College of Dentistry, beg leave to report:

That they find the said Board fully organized, and consisting of

well-known members of the profession; and that Drs. Ehric Parmly and Walter B. Roberts, have been regularly appointed delegates therefrom to this Association, and are therefore entitled to their seats.

All of which is respectfully submitted.

GEO. WATT.
W. C. HORNE.
H. J. MCKELLOPS.

The retiring President now delivered a very interesting address, upon the subject of 'Dental Education.'

Drs. W. H. Allen and W. P. Horton were appointed to escort the President elect to the chair, upon taking which he made a short, appropriate address.

The standing committees were now called. The Publication Committee presented the following report:

Mr. President and Gentlemen: — The Publication Committee regret to say that, owing to an inexcusable delay on the part of the person employed to furnish a phonographic report of the discussions at the meeting of the Association held at Chicago, it has been found impossible to carry out the instructions relative to publishing a revised edition of the Constitution and Transactions of the Association, from its formation to the close of the last session, in time for the present meeting. Every arrangement was made for the prompt appearance of the Transactions immediately upon the adjournment of the last session, by carefully revising the Constitution and Transactions already published, obtaining an estimate of the probable cost of publication, etc.; and the reporter at Chicago was repeatedly written to for his report; only within a very brief period however — too limited to get out the work in a creditable manner — has the manuscript come to hand. Under these circumstances, the committee, acting in accordance with the advice and approval of the officers of the Association, decided to merely publish for the present the minutes of the last meeting, along with the revised copy of the Constitution. Of these, two

hundred copies have been furnished for the use of the delegates in attendance upon the present session, at a cost of, $56 00

Postage and expenses on manuscript, 6 50

Making in all, $62 50

In conclusion, the Committee would respectfully recommend that sections first and second of the By-Laws be declared null and void, as the contingencies which they were intended to meet, are fully provided for in the Constitution, under ARTICLE THIRD, as sections seventh and eighth, and that the concluding part relative to additions to By-Laws be dispensed with.

J. H. McQUILLEN,
W. C. HORNE,
C. P. FITCH,
} *Committee.*

Report was adopted.

The Publication Committee asked for instruction in regard to the employment of a reporter for this meeting. Discretionary power was given them.

On motion of Dr. WETHERBEE,—

Resolved, That the suggestions of the Publication Committee be referred to the next annual meeting for constitutional action.

The regular order of business was suspended, that Dr. Keep might present a memorial from a Convention held in the City of Boston, July 30th, 1866, as follows:

To the American Dental Association:

MR. PRESIDENT: At a meeting duly held at the Representatives' Hall, Boston, the 30th day of July, 1866, by dentists from various parts of the United States, a committee was appointed to memorialize the American Dental Association, to take into consideration the subject of the claims now made upon the dentists of the United States, by the Goodyear Dental Vulcanite Company, and decide what they will do in the premises.

In pursuance of which we respectfully submit the above.

N. C. KEEP,
W. H. ATKINSON,
E. G. LEECH,
} *Committee.*

This memorial was referred to a Committee of five, viz: Drs. I. W. Lyon, N. C. Keep, C. W. Spalding, F. Y. Clark, W. C. Horne.

On motion of J. W. ELLIS, —

Resolved, That the thanks of this Association are eminently due, and are hereby tendered to the retiring officers, for the faithful discharge of their various duties.

Adjourned till 10 o'clock, to-morrow morning.

SECOND DAY.—Morning Session.

Association met according to adjournment.

Minutes of the last session were read and approved.

The PRESIDENT now called for miscellaneous business.

On motion of Dr. WATT, —

Resolved, That three dollars be assessed on each member of this Association in addition to the annual dues provided for by the Constitution.

The appointment of Clinical demonstrators, for to-morrow morning, was now made as follows: Drs. I. J. Wetherbee, W. H. Allen, I. A. Salmon, J. S. Knapp, G. A. Mills, C. Palmer, J. Taft, H. J. McKellops, W. H. Morgan, C. R. Butler, F. Y. Clark, Geo. L. Field, A. P. Southwick.

G. H. CUSHING.
W. P. HORTON.

On motion of Dr. GEO. H. CUSHING, —

Resolved, That the thanks of this Association be extended to Dr. N. C. Keep for his Address of welcome,—and that a copy be requested for publication.

DR. C. W. HORNE gave the following notice, viz:

I hereby propose that Article III., section 7 of the Constitution be amended so as to read: "SECT. 7. No member shall be permitted to address the Association before giving his name and residence,

which shall be distinctly announced from the chair, nor shall he address the chair more than twice upon the same subject, nor consume more than fifteen minutes unless by consent of the Association." And to add an additional section, viz:

"SECT. 8. Any act of special immorality or unprofessional conduct committed by a member of this Association shall be referred to the Committee of Arrangements, whose duty it shall be to thoroughly examine into the case, and report at the next meeting, if the charges be sustained. Whereupon, by vote, the offending member may be reprimanded or expelled; a two-thirds vote being required for expulsion, a plurality being sufficient for reprimand."

And to amend section 5 of Article III. so as to read "five" instead of "two" dollars.

The regular order of business was now resumed. The Committee on Dental Physiology presented their report.

The order of business was now suspended, for the appointment of a committee to receive and consider the memorial in regard to the Rubber question.

The following persons constitute that committee: Drs. I. W. Lyon, New York; C. W. Spalding, Missouri; N. C. Keep, Massachusetts; F. Y. Clark, Georgia; W. C. Parks, New York; E. G. Cummings, New Hampshire; O. R. Post, Vermont; J. M. Riggs, Connecticut; J. C. Robbins, New Jersey; A. B. Robbins, Pennsylvania; W. H. Morgan, Tennessee; J. S. Knapp, Louisiana; G. L. Field, Michigan; B. T. Spellman, Ohio; M. S. Dean, Illinois; W. F. Morrill, Indiana; W. H. Goddard, Kentucky.

Reports of Local Societies were now called for, but none were presented.

A volunteer Essay on Dental Physiology was read by Dr. JOHN ALLEN, pending the reading of which, the Association took a recess of thirty minutes. After which, the meeting was called to order, and Dr. ALLEN completed the reading of his Essay.

The discussion upon the subject of Dental Physiology now being in order, was engaged in by Drs. McQuillen, Allport, Suesserott and Atkinson.

Adjourned till 7½ o'clock, P. M.

SECOND DAY.—Evening Session.

Association met according to adjournment, President in the chair.

Minutes of the morning session read and approved.

Miscellaneous business being called, the Committee on Dental Ethics presented their report, action upon which was suspended for the time being.

The committee appointed upon the Rubber question, presented the following report:

Your committee would report that we recommend to the Association, the appointment of a commission of five members, who shall raise funds, and if satisfactory terms cannot be obtained from the company, in their discretion protect any member of the profession against the claims of the company in all courts of the United States.

I. W. Lyon, *Chairman.*

After some discussion the report was adopted.

On motion,—

Resolved, That a committee of five be appointed to nominate the commission, contemplated in the above report.

Committee, Drs. McKellops, Morgan, Horne, Lyon and Cushing.

Resumed the regular order of business — the discussion of Dental Physiology; by Drs. Atkinson, McQuillen, Barker, Allen, Dodge and Taft.

Adjourned till 10 o'clock to-morrow morning.

THIRD DAY. — Morning Session.

Association was called to order at 10½ o'clock, A. M. President in the chair. Minutes of the last session were read and approved.

On motion of Dr. ALLPORT, —

Resolved, That, at 2 o'clock, P. M., to-day, we proceed to select the place for the next Annual meeting of this Association.

Dr. B. F. ARRINGTON requested that a committee of five be appointed to meet with him this afternoon at 5 o'clock, to examine a new preparation of gold for filling teeth.

Committee, Drs. W. H. Morgan, C. R. Butler, J. S. Knapp, G. A. Mills, A. Lawrence.

The Committee on Dental Chemistry was called, but had no report.

The Committee on Dental Pathology was called, when Dr. ATKINSON, presented and read the report.

A paper was also read upon the same subject by Dr. C. R. BUTLER.

A volunteer paper upon the Sacrifice of the Teeth, was read by Dr. J. S. KNAPP.

A volunteer paper on Reproduction of Alveolar Process was read by Dr. ATKINSON.

Committee on Operative Dentistry was called, when the report upon that subject by Dr. J. A. KENNICOTT was presented. This was read by Dr. W. H. ALLEN.

Committee on Mechanical Dentistry was called, and the report upon that subject, by Dr. J. RICHARDSON was presented. This was read by Dr. GEO. L. FIELD.

The Association now proceeded to the selection of a place for the next annual meeting; after full and free consideration, Cincinnati was chosen.

Adjourned till 7½ o'clock, P. M.

THIRD DAY.—Evening Session.

Association met and was called to order at 8 o'clock. Minutes of the morning session were read and approved.

The Committee on Dental Education was called, when Dr. G. A. MILLS read the report. Dr. C. P. FITCH also read a paper upon the same subject; also one by Dr. J. S. LATIMER.

The order of business was now suspended, to hear the report of the committee appointed to nominate a commission upon the Rubber subject:

The committee appointed to nominate commissioners in regard to Rubber patents, beg leave to present the following names: J. Taft of Cincinnati, J. M. Riggs of Hartford, A. Hill of Norwalk, E. G. Leech of Boston, W. H. Morgan of Nashville.

All of which is respectfully submitted.

H. J. MCKELLOPS,
I. W. LYON,
W. C. HORNE,
W. H. MORGAN,
GEO. H. CUSHING,
} *Committee.*

Some of the nominees presented refusing to act upon the commission, the report was referred back to the committee, that it might be filled. The commission, as finally suggested by the committee, and confirmed by the Association, was as follows: C. W. Spalding, W. H. Morgan, E. G. Leech, J. M. Riggs, A. Hill.

The Committee on Nominations reported the list of standing committees which, after amendment, are as follows:

Dental Pathology and Surgery. — W. H. Atkinson, A. Hill, J. L. Suesserott, W. W. Sheffield, B. F. Arrington.

Operative Dentistry. — J. S. Knapp, C. R. Butler, Geo. A. Mills.

Mechanical Dentistry. — N. W. Kingsley, L. P. Haskell, I. A. Salmon, Corydon Palmer, S. B. Palmer.

Dental Education. — C. W. Spalding, Geo. T. Barker, G. F. J. Colburn.

Dental Literature. — R. W. Browne, M. S. Dean, E. V. N. Harwood.

Committee on Arrangements. — J. Taft, W. H. Goddard, H. R. Smith.

Committee on Publication. — L. D. Shepard, T. B. Hitchcock, J. McManus.

Committee on Prize Essays. — I. Forbes, W. M. Morrill, Geo. L. Field, A. C. Hawes, E. A. Bogue.

Dental Physiology. — J. S. Dodge, Jr., W. W. Allport, H. S. Chase.

Dental Chemistry. — E. Wildman, T. L. Buckingham, A. Lawrence.

Volunteer Essays. — John Allen, E. N. Harris, Geo. H. Cushing.

Special Committee on Microscopy. — J. H. McQuillen, Geo. S. Allan, R. W. Varney.

The above nominations were confirmed by the Association.

On motion of Dr. ALLPORT, —

Resolved, That the Committee on Publication for 1865 be requested to prepare their report ready for printing and put it into the hands of the Committee on Publication for the present year, by the 1st of September next, that ample time may be afforded to the committee, for publication with the proceedings of the present meeting.

Adjourned till 10 o'clock to-morrow morning.

FOURTH DAY. — Morning Session.

Association met according to adjournment. Minutes of the last session were read and approved. The regular order of business was resumed, when the report of the Committee on Dentifrices was read by Dr. J. MCMANUS.

The Committee on Dental Literature was called, when Dr. A. HILL presented and read the report upon that subject.

Dr. L. D. SHEPARD intimated to the Association that his Excellency Governor Bullock, of Massachusetts, would accept an invitation to be present at this meeting. The President appointed Drs. L. D. Shepard, C. W. Spalding and A. Lawrence a committee to escort the Governor into the room.

On motion, —

Resolved, That the Association take up the various reports in the order in which they have been presented, and proceed to their discussion.

Pending which, Governor Bullock was introduced, and made some very stirring remarks to the Association, in which he extended the welcome of the Executive department of the Commonwealth to this body, and also their concurrence in the action of the Legislative department, in granting to the Association the use of this hall.

The Governor having retired, the discussion was resumed by Drs. Kennicott, Miller, Knapp, Fitch, Watt, Atkinson, Taft, and Allport.

Adjourned to 7½ o'clock, P. M.

FOURTH DAY.—Evening Session.

Association met according to adjournment. President in the chair. Minutes of the morning session were read and approved.

Miscellaneous business being now in order, the report of the Committee on "The Code of Dental Ethics" was taken up, read, amended and adopted.

Adjourned to 9 o'clock in the morning.

FIFTH DAY.—Morning Session.

Association met at 9 o'clock. Minutes of the last session read and approved.

The subject of Mechanical Dentistry was taken up and discussed by Drs. Kingsley, F. Y. Clark, Mills, Allport, Taft and Atkinson.

On motion, it was agreed to adjourn at 1½ o'clock to day, meet at 3 o'clock and continue till 6 o'clock.

Discussion on Mechanical Dentistry was resumed by Drs. McKellops, Kingsley and others, during which the Association adjourned till 3 o'clock, P. M.

FIFTH DAY.—Afternoon Session.

The Association was called to order at 3½ o'clock.

1st Vice-President in the chair.

Minutes of the morning session were read and approved.

On motion of W. C Horne,—

Resolved, That a committee of three on Microscopy be appointed, and that they be requested to pursue investigations and report at the next annual meeting.

Committee, J. H. McQuillen, Geo. S. Allan, R. W. Varney.

On motion of Dr. Arrington,—

Resolved, That a committee, of one from each State, be appointed to investigate the subject of Dental Decay, in the various races and classes of people in this country, ranging between infancy and thirty-five years of age.

Committee: I. A. Salmon, Massachusetts; J. T. Metcalf, Connecticut; O. R. Post, Vermont; W. H. Atkinson, New York; J. Taft, Ohio; J. L. Nourse, Kentucky; Geo. H. Cushing, Illinois; J. C. Richardson, Indiana; J. A. Harris, Michigan; E. G. Cummings,

New Hampshire; A. B. Robbins, Pennsylvania; W. H. Morgan, Tennessee; B. F. Arrington, North Carolina; F. Y. Clark, Georgia; J. S. Knapp, Louisiana; Wm. G. Lord, New Jersey; D. W. Perkins, Wisconsin; J. R. Peebles, Missouri; A. P. Sayles, Iowa; F. N. Seabury, Rhode Island.

The discussion of Mechanical Dentistry was now resumed by Drs. Kingsley, Bogue, McKellops and others.

A vote of thanks was tendered to Dr. Kingsley for the very lucid manner in which he explained his method of making and adjusting artificial palates.

Adjourned till 9 o'clock, Monday morning.

SIXTH DAY. — Morning Session.

Association met according to adjournment, and was called to order by the 1st Vice-President.

Minutes of the previous session were read and approved.

The Publication Committee asked for instructions in regard to the publication and sale of the Transactions. In answer to that request, the Committee was granted discretionary power.

On motion, —

Resolved, That the Publication Committee be instructed to strike the addenda from the Report on Mechanical Dentistry, presented to this body at its last annual meeting.

Dr. W. C. Horne presented the following action of the dentists in attendance here from other sections of the country:

"At a meeting of the members of the American Dental Association, held at the Revere House, on Monday morning, August 6th, Dr. Morgan was called to the chair, and Dr. Kingsley to act as secretary. A committee was appointed to prepare resolutions of thanks for adoption by this meeting."

Committee, Dr. I. Forbes, J. Taft, F. Y. Clark, W. C. Horne.

The committee presented the following, which were unanimously adopted:

Whereas, The members of the American Dental Association, having received marked kindness and attention during their sessions in the city of Boston, are desirous of expressing their appreciation of those courtesies; therefore,

Resolved, That our thanks are hereby tendered to the authorities of the State for granting the use of the Legislative Halls for the purposes of this Association.

Resolved, That to our Committee of Arrangements and the dental profession of New England we owe a debt of gratitude, for their unceasing efforts to contribute to our comfort and pleasure, which we will ever hold in remembrance.

The subject of Dental Education was now taken up and discussed by Drs. Miller, Kingsley and others.

The announcement was made that Gen. Ben. Butler was in the city, whereupon it was

Resolved, That a committee of three be appointed, to invite him to visit the Association.

After a short time, the committee escorted the General into the hall. He addressed the Association in a few appropriate and characteristic remarks. After which a recess of ten minutes was granted, for the introduction of members to him.

On motion of Dr. S. P. MILLER, —

Resolved, That this Association is happy to see and hear Maj.-General Butler, and to express the desire that he had been in command at New Orleans one week ago, with force sufficient to have prevented the late massacre.

Protest. — The undersigned, members of, and delegates to, the American Dental Association, earnestly protest against the action of a majority of this body, in refusing to reconsider the vote, by which the above resolution was passed — the ground of our protest is this: The subject-matter contained in said resolution, we regard as wholly foreign to the objects for which this body was organized. Signed, H. J. McKellops, J. C. Gifford, W. H. Goddard, H. R. Smith, C. W. Spalding, J. S. Knapp, Geo. H. Cushing, F. Y. Clarke, W. H. Morgan, F. Searle.

The subject of Dental Education was now taken up for con-

sideration, and opinions expressed by Drs. Hill, C. W. Spaulding, McKellops, Fitch, Taft, Lawrence, Atkinson and others.

On motion of Dr. LAWRENCE, —

Resolved, That a committee of three be appointed to draft suitable suggestions upon the subject of accepting students, and that such suggestions be printed in circular form, for the consideration of every dental practitioner in the United States. And that the expense of such printing and distribution be borne by this Association.

A. LAWRENCE,
C. P. FITCH,
J. TAFT,
} *Committee.*

An invitation was now extended to the members of the Association by Dr. N. C. Keep, to a social entertainment to be given at his house this evening, at 6½ o'clock.

On motion of Dr. MCKELLOPS, —

Resolved, That this Association urgently request all members of the profession, who may have in their possession any anatomical, physiological or pathological dental preparations, or specimens, to place them in the Museums of the dental colleges, that they may there be of the greatest value to the profession.

Dr. A. LAWRENCE presented the following, which was unanimously adopted:

Whereas It is eminently fitting to suitably recognize the services of the benefactors of mankind while living; and *whereas* the use of the *mallet* as an adjunct in filling teeth, is almost universally adopted with results in the highest degree satisfactory; therefore—

Resolved, That Dr. W. H. Atkinson, of the city of New York, is entitled to the lasting gratitude of the dental profession for the introduction of the mallet in dental practice, and for his kind and efficient teachings in its use.

Adjourned till 3 o'clock, P. M.

SIXTH DAY. — Afternoon Session.

The Association met at 4 o'clock and was called to order by the 1st Vice-President.

The minutes of the morning session were read, amended and approved.

Dr. MORGAN, of Tennessee, directed the attention of the Association to a preparation of gold for filling teeth, denominated "Shred Gold," introduced by Dr. Arrington, of North Carolina.

Dr. B. T. SPELMAN gave notice of proposed amendments to the Constitution as follows, —

Insert between sections 2 and 3 of Article III. the following:

"To be entitled to representation in this Association, Dental Societies shall be required to adopt or substantially recognize its code of ethics."

And insert between sections 4 and 5 of the same article the following:

"Any member of a local or State association who is expelled from the same, shall cease to be a member of this Association from the date of his expulsion."

Also the following by Dr. I. FORBES:

In Article V., section 1, third line, strike out "two" and insert "one."

The subject of Dentifrices was now taken up and discussed by Drs. Spaulding, Colburn, Kennicott and others.

The motion fixing the time of final adjournment was now reconsidered and two o'clock to-morrow fixed as the time of final adjournment.

The Association now adjourned to meet at ten o'clock to-morrow morning and proceed to the house of Dr. Keep in accordance with an invitation previously given and accepted.

SEVENTH DAY.— Morning Session.

The Association met at 10 o'clock, A. M. The President in the chair. The minutes were read and approved.

The following bills were presented and ordered to be paid:

Boston, Aug. 6th, 1866.

The American Dental Association, Dr.
To the services of four janitors and one boy. . . $116 00

Boston, Aug. 6th, 1867.

The American Dental Association, Dr.
To printing cards, envelopes, etc. $18 33

The American Dental Association, Dr.
To J. Taft,
To printing list of membership $7 50

The American Dental Association, Dr.
To Moore & Co.,
To moving chairs, etc., for use of Association . . $10 00

The American Dental Association, Dr.
To Publication Committee,
To printing minutes of the sessions of 1865. . . . $56 00
To express and postage 6 50

$62 50

The subject of "Operative Dentistry" was now taken up and discussed by Drs. Knapp, Fitch, Kennicott, Wetherbee and C. Palmer.

The commission appointed to consider the Rubber question was announced as ready to report, which was done by Dr. E. G. LEACH, of Boston, as follows:

Mr. President and Gentlemen of the Association:

Your Commission would respectfully report that after full and free consultation with the agents of the Goodyear Dental Vulcanite Company, they had agreed upon the following propositions, viz:

I. Liability to commence May 1st, 1865, and to be estimated at the amount agreed upon as future rate.

II. A discount of fifty per cent to be made on amount found to be due July 1, 1866.

III. The fifty per cent actually paid to be refunded in equal yearly payments of twenty per cent per annum from the future payments under the license.

IV. The rates of license shall be $1.00 for all plates bearing six teeth and under, and $2.50 per plate for all over that number.

C. W. Spalding,
W. H. Morgan,
J. M. Riggs,
E. G. Leach,
A. Hill,
} *Commission.*

After the reading of the report it was discussed at some length, and various questions were propounded and answered.

The report was then adopted.

The name of Dr. George S. Allan was transferred from the Committee on Physiology to that on Histology, and the vacancy thus made in the Committee on Physiology was filled by the name of Dr. Allport.

A vote of thanks was unanimously tendered to S. S. White, Codman & Shurtleff, O. F. Harris and I. A. Salmon, for the use of their chairs, and other appliances for the Association, during its sessions here.

A vote of thanks was also tendered to the officers of the Association.

The President, Dr. Fitch, in view of the hour of adjournment having arrived, made some appropriate remarks, in which he most cordially thanked the Association for the courtesy and kindness he had experienced as the presiding officer.

Dr. W. H. Goddard, of Louisville, Ky., on behalf of the profession of the West, extended a most hearty invitation to all the members of the Association, to be present at the meeting next year. After which the Association adjourned to meet in Cincinnati, Ohio, on the last Tuesday of July, 1867.

J. TAFT, *Secretary.*

ADDRESS OF WELCOME,

BY

N. C. KEEP, M. D., D. D. S.

Mr. President and Gentlemen of the American Dental Association:

The very pleasant duty of presenting the welcome of the Massachusetts Dental Society and the dentists of New England to you has been assigned to me. I recognize in each of you, gentlemen, a delegate of some society, bringing with you the fruits of the research and observations of the society which you represent, and commissioned to carry back from this meeting the results which may be eliminated from examinations of specimens, clinics and discussions by this Association. Gentlemen, the meeting of such numbers of our profession to consult for the advancement of rational and scientific principles, and thereby to promote the usefulness and respectability of our specialty, is of recent date. These meetings, if judiciously conducted, must exert sanitary and scientific influences of the highest moment. To accomplish this most desirable object, let each resolve to seek earnestly for the truth.

I welcome you to the Commonwealth of Massachusetts; her jewels are her children. For half a century at least, the accumulation of wealth, so often the object of effort and desire by the world at large, has been raised above the mere love of accumulation by an enlarged benevolence As illustrations of what I mean, I might cite the examples of McLean, Lawrence, Appleton, and the great prince of givers, Hon. George Peabody, whose benefactions to society are like copious showers, when the

humblest plant and the ornamental shrub are stimulated to new life, usefulness and beauty. Names like these, sons of Massachusetts, who have been benefactors of mankind, are sure to be remembered with honor and complacency by us, fellow-laborers in diminishing human suffering. By the remedial powers of our art, we are enabled to do much to relieve distress and improve the conditon of the unfortunate.

In seeing our institutions, to which we welcome you, you will find the great New England idea that they are to promote the education, comfort and happiness of all classes of society in the main carried out. Provision is made for educating all classes of persons, and every profession except dentists. But we hope ere long to have a dental college, museum and library, which are urgently needed. I welcome you to the city of Boston, to Faneuil Hall, to Bunker Hill, to Harvard University, to our State and City Hospitals, to our City Library, to the collections of the Boston Society of Natural History, to the Warren Museum, where the most perfect skeleton of the mastodon is preserved, to the Institute of Technology, to the cabinets of the Medical College, to our harbor and its islands, and last, but not least, to our hearts and hospitalities.

ADDRESS ON RETIRING FROM THE CHAIR,

BY

C. W. SPALDING, D. D. S.

Gentlemen of the American Dental Association:

Another year has passed away, another cycle has been added to the unending course of time since last we met; yet in the Providence of God we are again permitted to come together laden with the fruits and experiences of the year that is past, that with grateful hearts and with minds earnestly devoted to the great cause of human progress, we may lay our "free-will offerings" *here* upon the common altar of our profession.

At these annual gatherings, the representative men of the various societies and institutions of learning that are scattered over our extensive country are brought together. This body may therefore be regarded as comprising the wisdom, intelligence and learning, as well as the energy and inventive genius of the whole profession.

This assemblage, therefore, representing as it does the entire profession in the United States, is the proper one to consider all important propositions, and to determine upon such general measures as are designed for the promotion of the best interests of the profession at large.

As I purpose on this occasion to occupy but very little of your valuable time, I come at once to the consideration of the topic which I propose mainly to speak of at this time, viz: The enlarging the facilities and improving the means for the attain-

ment by the dental student of a thorough professional education.

There can, I think, be no diversity of opinion as to the necessity for improvement in the direction indicated. Moreover it is the interest of each one of us that this work should be commenced at the earliest practicable moment, for that the interest of every member is identical with that of the whole, is to my mind a self-evident proposition. In considering, therefore, what are the most direct and more effectual means of accomplishing any of the objects sought to be attained, let no one suppose that he has or can have any private interests which are adverse to those of the general body.

It is this way alone, viz: by merging the individual in the general interest, that we shall find the easiest and most rapid realization of our highest hopes and wishes. That this sentiment will continue to prevail even to a greater extent than it has done heretofore, we have the fullest assurance in the self-sacrificing spirit which is manifestedly a growing sentiment among us, as well as in the spirit of devotion to professional interests which has characterized the five previous meetings of this body.

Every profession fixes its own standing in society, carves its own niche in future history, and determines the estimation in which it shall be held in the public mind. Ours constitutes no exception to this rule.

Now, whether this standard shall be high or low, depends entirely upon the intelligence, culture, professional attainments and high-toned morality of the individuals of which the profession is composed. These accomplishments are the very elements of a profession and are what distinguish it from a trade. In what way then can we best aid those who are seeking to enter our ranks, in the acquirements of these qualifications? I answer it is to a thorough system of education in the sciences, to a proper preparation for the practice of our specialty, by a course

of instruction especially designed to meet these requirements, that we must look, and on which we must mainly rely for a continuance of the work of progressive improvement so auspiciously begun by the dental colleges already in existence, and which I am certain will be encouraged and supported by this Association. In a young profession, however, this higher standard cannot be reached at once. Such a result must not be expected. A profession, no more than a man, can pass from youth to manhood at a single bound. Growth, steady, gradual but constant growth, is requisite, and all the steps from infancy to mature age must first be passed over. The strides may be strong and rapid or they may be feeble and uncertain, yet in either case the whole ground must be gone over before the end can be reached. This labor is to be accomplished step by step, every advanced point attained serving as a stepping-stone to a higher one.

Above all, let us take no step backward; rather let every man strive to reach a higher point than he has reached hitherto, and let you and I and every one of us feel that a share of this duty and responsibility rests upon his own shoulders. Let also every man realize that his particular share in the work must be performed and done by himself alone. No other man can discharge *his* duty! No other one can fill *his* place!

I have already said that our main reliance must be on education, — a thorough, systematic course of education, by means of schools devoted *exclusively* to this object, and so organized that the whole course of study shall be directed to the special preparation of young men for a dental practice. This, in my opinion, is the great want of the dental profession at this time. In casting about to discover what are our leading needs — our most pressing necessities, I have no difficulty whatever in coming to this conclusion. I am therefore the earnest friend and supporter of *dental* schools. I doubt the utility of attaching a dental chair or chairs to schools of medicine, for the purpose

of graduating students to practise dentistry. In my estimation such chairs are much needed in medical schools, but are useful only as a means of rendering the qualifications of the medical student more complete and comprehensive. I cannot now enlarge upon this branch of the subject, but may at some future time resume this particular topic.

Impressed as I am with the conviction that no subject of greater importance to the future well-being of our profession, can engage the attention of this body, I take this occasion to bring the subject to your notice, and to propound to you the question whether we do not need a better, as well as a more extensive system of dental education.

To this question there can be, I think, but one response. The want is too perceptible to require either an argument or an examination to prove its existence. It has been felt and seen by every one of us, and all are doubtless convinced that the necessity exists. The next question to be considered is whether the thing is practicable. Can it be done? Have we the means for its accomplishment within ourselves? And if these questions are affirmatively answered, the final one is, — How can it best be accomplished?

Inasmuch as the practicable aspect of this subject may not be entirely clear to all, I propose to spend a few minutes in demonstrating its feasibility. In the first place, have we the amount of educated talent within our own ranks which would be required to discharge the duties involved in the prosecution of the proposed work? I answer, we have. All that is necessary is to draw out, to interest and to enlist that talent, and we shall find that we have it in abundance. Who among us cannot now point to one or more individuals fully competent to engage in this important work, aside from those already engaged therein? And who does not see that the bringing together of all the men in the profession who are already prepared to engage in such a labor would constitute a corps of competent

instructors much more than sufficient for all our present wants? This talent, I admit, is somewhat scattered, and cannot all be made available at this time. Enough, however, is at our command to serve our present purposes, and more will be attracted to the work in proportion as the want increases and success becomes certain.

All enterprises of this character require, to ensure success, *two* principal things, — men and money. The ranks of the profession will supply the first, the second must come from their pockets. A little calculation will show how easily the necessary funds could be obtained, and how light the tax would really be, which would yield sufficient means to place the whole enterprise upon a substantial basis.

Let us suppose there are within the limits of the United States ten thousand intelligent dentists who can well afford to contribute to this important object. This they ought to do, and would probably be found willing to do, if they were rightly approached. The subject, however, should first be presented to them in its true light, and their co-operation should be solicited, when, I believe, a large proportion of them would be found ready to join hands with those who are already engaged, by contributing either their money or their services in aid of this great work.

Suppose the whole number of ten thousand men should each contribute twenty-five dollars a year for a period of four years. This light tax would yield the enormous amount of one million of dollars. This immense sum would be raised by the trifling contribution of twenty-five dollars yearly for four successive years. Truly there are none who could not appropriate that small amount to secure such an immense advantage to the profession of his choice.

If but the one-half of the sum mentioned were realized, we shall have provided for a most evident present want; we shall have done for the succeeding generation what they cannot do

for themselves, and shall have secured the future prosperity of our profession beyond a peradventure.

Having, as I think, shown that the scheme is practicable, let us now glance at some of the modes which suggest themselves for its accomplishment, and then pass to the consideration of some of the results which would legitimately flow from its operations. To effect its accomplishment we must first arouse a deeper interest in the dental schools already established. We must relieve them from the pecuniary embarrassments under which some, if not all of them are now laboring. We must provide them with the needed appliances for putting their respective institutions into good working condition. They are in want of books for their libraries, furniture for their infirmaries, fixtures and machinery for their laboratories, preparations and specimens for their museums, chemical and philosophical apparatus, etc., etc. Their wants, in these respects, are but very inadequately supplied, some being tolerably well provided in certain departments, and others in others; yet all, to a greater or less extent, feel the want of that substantial aid which money alone can give them.

The next important consideration is the establishment of an additional number of schools. So far as I know, there are but five dental colleges in the whole United States. One, the oldest, God bless her, in Baltimore, two in Philadelphia, one in New York and one in Cincinnati. There is not one in all the Southern States proper, none in what we now designate as the great West, which lies beyond Ohio and stretches to the Pacific Ocean, none in all New England; even the Athens of America, famed as she justly is for her institutions of learning, affords no school where the dental student can slake his thirst for scientific knowledge and fit himself for the highest practice of his art. Should these things be so? Shall we longer stand with palsied hands and lift not so much as a finger in aid of this too-long-neglected interest? I know there are some here to whom

these remarks do not apply. There are those, both present and absent, who have contributed liberally both in time and money to the cause for which I am now pleading, and, if I know the temper and spirit of the men here assembled to-day, as well as that of those whom they have left at home, they will rise in their might and say, "It shall be so no longer!"

But, to accomplish our whole object, we want to enlist the sympathies and ensure the co-operation of the whole mass of the profession. To do this, it needs only that the subject shall be fairly uncovered and laid before them, that all may see for themselves and know what is requisite to place this matter on a proper footing, when, I am confident, they will cheerfully respond to any call that may be made, and help to place their own profession on its merited basis in education, as in all things else.

Heretofore the establishment of dental schools has been no light or easy task. The noble, self-sacrificing men who have acted as pioneers in the work, and who have freely given both their time and their money to it, are entitled to the lasting gratitude of the whole profession. None know the amount of labor necessary to establish and maintain a dental college during its first years, who have not themselves made the effort. But it is not my purpose here to eulogize these men. They have but discharged their duty, and in the consciousness of having done this, they find their reward.

I am aware that difficulties almost insurmountable have heretofore surrounded this whole matter of obtaining a dental education. The obstacles have been so great that many who earnestly desired it, have been unable to avail themselves of its advantages. The schools have been few and beyond the reach of many who were preparing themselves for the practice of dentistry. Consequently, I say that no man is at fault who has made the most of the means within his reach, and improved every possible opportunity for advancing himself in professional

acquirements. But it is our duty to multiply and to improve these means. Our young men have a right to demand this at our hands, for it is among them that this work is mainly to be done. Those among us who have been long in practice cannot do otherwise than to go on in the way in which we began. But once having provided ample educational facilities, we, in return, shall have the right to insist that every candidate before assuming the high duties of a practitioner of dentistry, shall, *at least*, have passed the ordeal of a thorough examination before a properly constituted dental board, if we do not go still farther and demand that he shall have graduated at a dental college.

It is in this direction that we must look. It is in this path that we must labor if we would hereafter console ourselves with the reflection of having discharged our whole duty to the profession to which we belong.

Think you that the public would not appreciate and honor a profession composed of such materials and filled with such men as this measure contemplates? Think you that it would not assert for itself a position that would command the consideration and respect of all men and of all professions? When I allow my imagination to carry my thoughts forward into the bright but certain future which would then be realized, I am carried away by my enthusiasm, and in my fond anticipations I see the work already done. I witness the beneficent effects resulting from its accomplishment in beholding a profession honored and respected by all; its ranks occupied by intelligent, aspiring and cultivated men who are both an honor to themselves and a blessing to mankind; its members all animated by the desire of faithfully discharging their duties to society and to themselves, and in return reaping an ample remuneration for the skilful performance of their arduous labors.

Is this picture too highly drawn? Do I allow my too ardent enthusiasm to carry me beyond the bounds of a reasonable hope? I trust not. I believe not. I believe all this can be accom-

plished in a single decade of years, if we will but call into activity the forces which lie within our reach. The necessary talent is now at our command ready and willing to engage in the work. The only thing lacking to carry this work forward, not only to a successful but to a most brilliant issue, is money.

I believe the result is easily attainable if the profession will but supply the necessary "material aid." Let it not fail, then, for the want of a few paltry dollars. Let it not be said that the present generation of dentists faltered for a moment in securing to their successors every needful facility for obtaining a complete professional education. Rather let us make a thorough education so easily attainable that no one in the future should or could be excused from its acquirement.

Do this and we will have done our share in hastening the time (and I say with all my heart God speed the joyful hour) when no man in all this broad land would be recognized as a competent practitioner of dentistry, or be admitted into its ranks and hailed as a brother who had not first passed through a full dental collegiate course.

Gentlemen, I have glanced at this subject. I have done no more than to bring it to your notice, under the belief that no more than this is necessary to induce you to take such action as will in your judgment most speedily secure its benefits. The Committee on Dental Education will present an able report, and others, I understand, will also contribute papers upon this subject. It has been my purpose merely to call your attention to it at this early day. I leave the matter in your hands.

DENTAL HYGIENE.

BY

HENRY S. CHASE, M. D., D. D. S.

READ BY W. H. MORGAN, M. D.

The subject which I propose to discuss in this essay has never, to my knowledge, received from either the dental or medical profession a tithe of the attention which its importance deserves. A thorough understanding of its principles by the whole civilized word cannot be overvalued. Fathers, mothers and children should all understand it.

It was said at our last meeting at Chicago that this is an impracticable subject, but I think not, and at any rate I consider it my duty to teach everywhere what little I know about it, and leave the responsibility of practice to those who have been warned.

If my humble efforts to elucidate this matter shall have the effect to stimulate the profession to a thorough study of this important and interesting department of dental physiology, my labor will be amply rewarded.

There are some chemical data that I should have been glad to have incorporated into this paper, which I have been unable to find. Further experimental research is necessary to give us all the material we need with which to raise the symmetrical edifice of DENTAL HYGIENE.

In pursuance of this study let us make the following inquiries:

Of what are the dental tissues formed?

At what age are they formed?

Where are the materials found?

What are the chemical constituents of the various kinds of food in common use?

Do hereditary diseases and medicinal substances affect the nutrition and growth of the teeth?

Of what value are bathing, exercise, fresh air and sunlight in the production of perfect dental tissues?

The human teeth are composed of both organic and inorganic elements. Their incineration will leave behind an *ash*, or inorganic elements in pretty constant proportions. All the tissues of the body yield more or less ash on incineration, and the only peculiarity about the teeth is, that they contain so *large* a proportion of this ash. It is this inorganic remainder which gives hardness to these organs and renders them able to comminute the food thoroughly. Therefore, the perfect or imperfect development of the teeth depend, in a great measure, on the relative quantity of ash which they contain, compared with the organic substances united with it. The teeth of old people contain a larger quantity of inorganic materials than the young; in fact they continue to increase in weight of ash from infancy to adult life.

The following analysis of dentine and enamel are from Tomes:

	Dentine.		Enamel.
Phosphate of Lime	66.72		89.82
Carbonate of Lime	3.36		4.37
Phosphate of Magnesia	1.08		1.34
Salts	0.83		88
Cartilage	27.62	Chondrine	3.39
Fat	0.40		0.20

It is well known that the blood is the source from whence must be obtained all the materials, both organic and inorganic, of which the teeth are composed.

The following analysis of the PLASMA of the blood is from Lehmann.

1000 parts of liquor-sanguinis contain:

Water	902.90
Solid constituents	97.10
Specific Gravity	1.028
Fibrin	4.05
Albumen	78.84
Fat	1.72
Extractive Matters	3.94
Mineral Substances	8.55
Chlorine	3.644
Sulphuric Acid	0.115
Phosphoric Acid	0.191
Potassium	0.323
Sodium	3.341
Oxygen	0.403
Phosphate of Lime	0.311
Phosphate of Magnesia	0.222

The blood is formed and its quality kept permanent by the reception and digestion of food, whether solid or fluid, and by imbibition and respiration. Everything that enters the body capable of giving it nourishment, whether organized or unorganized, we recognize as food. For instance, the oxygen which is inspired and enters the blood, and afterwards becomes solidified in the tissues, as well deserves the name of food as the bread we eat. I think it probable that inorganic substances which are not combined in organic materials by a natural process of growth in the vegetable cell, cannot be considered *food*, although they may circulate in the blood.

Animals sicken and die when fed upon the productions of the *chemist* instead of that from the alembic of NATURE.

Mineral substances which enter into the formation of the tissues of the body must first have been assimilated by the vegetable cell before they can be made available for the nutrition of

the animal. And when incorporated into the animal cell then they can be used as food by other animal life.

In the bones and teeth, lime is found chemically united with the animal tissues, so as to form a compact and resisting mass, eminently fitted for the purpose which it is destined to serve in the animal economy.

The following analysis of BONE is from Lehmann:

Phosphate of Lime	57
Carbonate of Lime	8
Fluoride of Calcium	1
Phosphate of Magnesia	1
Mineral constituents	67
Cartilage	33
	100

The relative weight of osseous tissue to that of the whole body is about one-eighth. This would call for about twelve pounds of inorganic materials in a person whose weight is one hundred and forty pounds.

Any inorganic substance which is a *necessary* constituent of the blood, although required in *minute* quantity, is of *equal importance* to one required in *larger* quantity. Therefore we *cannot* say that LIME is the most important of all the inorganic elements which compose the body, although it constitutes the greater proportion by weight of the bones and teeth, and is an universal ingredient of every fluid and solid of the human system.

There is also a *daily* call for the phosphates and other salts for the purpose of maintaining the *every* tissue of the body in health. For we find a certain quantity daily excreted by the urine, fæces, and perspiration, whether food is ingested or not. It takes place as long as life lasts in a starving animal.

The tissues of the body are undergoing continual change; the process of disintegration and formation is constantly taking place in the cells, and as rapidly as the various elements have

performed their mission in sustaining life they become effete and are cast away.

The quantity of URINE daily secreted is about thirty ounces in the adult. Of this the saline matters constitute about one-thirtieth, therefore about one ounce per day is excreted in the urine.

The FÆCES also contain a considerable amount of the phosphates, but nothing like the proportion found in the urine.

The PERSPIRATION is a vehicle in which also a considerable amount of salts is excreted.

Thus it may be observed that the *demand* for LIME SALTS by the human body is greater than for any other inorganic material.

Undoubtedly more or less of the saline matters excreted are supplied by water and other drinks, and the amount varies according to the quantity and quality of the food ingested.

Having now ascertained what constituents are necessary for the formation of the teeth, and also the demands of other portions of the body for the same inorganic elements, let us inquire where these are to be found. We have already seen that the blood contains them, and it now remains for us to ascertain their proportions in the various kinds of FOOD in most common use.

The Creator of the Universe has bountifully supplied his creatures with the necessary food to build up their bodies in strength and maintain them in health; every element they require being found in nearly every kind of *natural* vegetable and animal food.

Let us examine this assertion in regard to the saline ingredients which particularly interest us, as giving hardness to the teeth and bones.

First, as being the great "staff of life," in this country, we will look at WHEAT.

The following analysis is by Prof. Horsford, of Cambridge.

In 100 parts of the ash of wheat, there are:

Potassa	29.79
Soda	3.90
Magnesia	12.20
Lime	3.34
Phosphoric acid	46.02
Sulphuric acid	.33
Silica	3.35
Ox. iron	.79
Chloride soda	trace

The following analysis of oats, rye, barley, beans, peas, turnips and potatoes, from Johnston's Ag. Chemistry, show the quantity of ash contained in 1000 parts:

	Oats.	Rye.	Barley.	Beans.	Pea.	Turnips.	Potatoes.
Potash	1.50	5.32	2.78	4.15	8.10	23.86	40.28
Soda	1.32		2.90	8.16	7.39	10.48	23.34
Lime	.86	1.22	1.06	1.65	.58	7.52	3.31
Magnesia	.67	1.78	1.80	1.58	1.36	2.54	3.24
Alumina	.14	.24	.25				
Ox. Manganese		.34					
Silica	19.76	1.64	11.82				
Sulph. Acid	.35	.23	.59	.89	.53	8.10	5.40
Phos. Acid	.70	.46	2.10	2.92	1.90	3.67	4.01
Chlorine	.10	.09	.19	.41	.38	2.39	1.60

Horsford, quoted by Lehmann, found the ash in 100 parts of:

Wheat	3.13	Potato (dried)	3.61
Rye	2.37	Carrot "	5.17
Oats	4.14	Turnip "	7.68
Barley	2.84	Parsnip "	4.50
Beans	4.38	Buckwheat	2.30
Peas	4.72	Wheat Flour	.70
Cabbage	7.02	Rye Flour	1.07
Onions	8.53	Buckwheat Flour	1.09
Indian Corn	1.92		

Perçira on food and diet. Ash of tea:

	Chinese.	Japanese.
Potash, sulphate, and Mu. Potass	2.84	3.40
Ox. iron, sulph. carb., phosphate of lime, and carb. magnesia	1.72	1.64
Silica	0.38	0.42

Pomaceous fruits, and in fact nearly all fruits, have as much, and many contain a greater per cent of the phosphates, in the dry state than wheat or the other cereals. The analyses of Berard prove this.

There is one kind of food which nature has expressly prepared, which may be called *perfect* because of its containing all the elements of nutrition in just the right proportions for the sustenance and growth of animal life. That this is so cannot be denied, because it is the only food which the recently born are capable of digesting. This is MILK.

Analysis of O. Henri and Chevalier. The solid substances in 100 parts of the milk of the

Cow	12.98	Goat	13.20
Ass	8.00	Ewe	14.38
Woman	13.00		

The following analysis of the *ash* in 100 parts of cow's milk, is by Schwarts:

Chloride Potassa	.1350	Phos. Lime	.1805
Soda	.0115	Phos. Magnesia	.0170
Phos. Soda	.0225	Phos. Iron	.0032

The ash in 100 parts of the white and yolk of egg, yield

Sulphuric Acid	0.25	Potash, Soda, and their carb's.	1.72
Phosphoric Acid	.50	Lime, Magnesia, and their Carbonates	.49
Chlorine	.67		

Playfair gives the following final products in 100 lbs. of

	Dried Beef.	Dried Blood.
Carbon	51.59	51.83
Hydrogen	7.17	7.57
Nitrogen	15.07	15.01
Oxygen	21.39	21.37
Ash	4.42	4.23

Their *similarity* is worthy of attention.

Johnston, of England, states the ash of dried muscle to be composed of

Phosphate of Lime	66.66 pr. ct.	Other Saline matters.	33.33 pr. ct.

Lehmann states that the amount of nitrogen in muscular fibre does not differ much throughout the animal kingdom. He finds in 100 parts of

	Parts of Nitrogen.		Parts of Nitrogen.
Beef	13.87	Oysters	5.25
Mutton	11.30	Cheese	7.11
Ham	8.57	Egg	13.44
Liver of Ox	10.56	Cow's Milk	3.78
Salmon	12.35	Woman's Milk	1.59
Herring	14.48		

Vegetable substances contain it in much less quantity, viz:

	Parts of Nitrogen.		Parts of Nitrogen.
Rice	1.39	Oats	2.2
Potatoes	1.50	Peas	3.8
Wheat	2.20	Beans	5.1
Rye	1.7	Barley	2.0
Maize	2.0		

It is well known that it is the nitrogenous portions of food that build up the muscular and fibrous tissues. This nitrogenous portion also contains more of the elements of the osseous tissue, than the non-nitrogenous. For instance, in the kernel of wheat the gluten cells contain almost all the phosphates of the grain, while the starch cells are nearly valueless in this respect. This is an important fact to be remembered in the study of dental nutrition.

The *fine flour* of the cereals and leguminous plants is composed mostly of STARCH. In wheat flour, starch constitutes 75 per cent; rye, 60; barley, 65; oat meal, 75; rice, 85; buckwheat, 50; pea and bean meal, 42; dry potatoes, 75. Starch cells wherever found contain but a very small proportion of the phosphates. It is the gluten cells that are the great receptacles of bone and tooth materials.

We have now seen that all the usual articles of food as *naturally* produced contain the elements for the organization of the body, and for its daily nutrition.

There are many of them which would alone, individually, produce this result; but the Creator in his munificence has not restricted us to a single article of diet. He has kindly supplied us with unnumbered varieties peculiar to different soils, seasons and zones, suited to the varied appetites of individuals and nations. Man being a "citizen of the world," finds in every clime either animal or vegetable food adapted to his sustenance. The proximate principles of animal and vegetable food are very like. Vegetable albumen differs but little from animal albumen. Vegetable gluten is nearly the same as animal fibrine. So also of the fats. Olive oil is nearly identical with the margaric acid of the human body. The saline substances are identical in both.

Our daily food must contain *all* the proximate principles in an *organized* state, which are found to compose the tissues of the body; otherwise starvation to a greater or less extent ensues.

Gluten or fibrine to make muscle and cartilage.

Phosphates for the bones.

Fat for cushions and lubrications.

Starch and sugar for animal heat.

All the tissues are formed of four final elements, excepting the earthy and saline matters, viz: CARBON, OXYGEN, HYDROGEN and NITROGEN. The same is true of all kinds of food, and yet man would die of starvation in a few days, if supplied with only these *ultimate* elements for his nutrition, instead of the *proximate* principles which they in combination produce in organic life.

Experiment shows that vegetable life cannot perfect itself in a soil deficient in the elements which are natural to the plant. It also shows that animal life can be sustained only a short time on food deficient in the elements of animal tissues. Even animal albumen or fibrine, alone, in the experiments of Magendie, would sustain a carnivorous animal but a few days. Starch, sugar, gum and oil are necessary adjuncts. On the

other hand, starch, sugar, gum or oil, are equally disastrous to health and life when used alone.

I do not know that experiments have ever been made to demonstrate the results of total abstinence from the inorganic elements. But every physiologist will admit that the experiment would prove as fatal to life as in the former cases. As wheat cannot be produced where there is no lime applied to or existing in the soil, so neither bones nor teeth can be formed when the phosphates are not in the food.

It is a great error to believe, as thousands do, that starch is THE nutritious principle of food, and that the more of this substance contained in it the better it is. Starch is an abundant element in all the cereals, which surely indicates its equal importance with the other alimentary principles. But its principal use, as before stated, is to sustain the heat of the body, the functions of which cannot be executed without a temperature of at least 95°, and not well less than 98°. Life is extinguished when the whole body loses eight degrees of temperature.

The nutritive effect of food does not depend wholly upon the amount of nutritious elements which it contains, but very much also upon the facility with which the cells are separated and taken up by the absorbents; upon its porosity, allowing the digestive fluids to act; and upon its *compatibility* with the digestive organs.

Muscular fibre, which is easily separated, is more nutritious than the white or yellow fibrous tissues. An increased surface for the digestive fluids to work upon, is promotive of digestion. Light bread is easier of digestion than that which is heavy.

COMPATABILITY depends on the state of health, and on *idiosyncrasy*. Thus food which might be received with pleasure during health, often acts as poison to the system in disease. Every one is acquainted with the fact that some persons have peculiarities which compel them to avoid articles of diet, which

are not only nutritious, but which are to most people luxuries. Some cannot eat a single strawberry without becoming sick. A friend of mine can eat nothing containing egg without being very ill.

VARIETY of food is well known to be favorable to health. The great diversity of edible products natural to one climate seems to indicate the propriety of making use of them. Man deprived of either animal flesh, the cereals, roots or fruits, for some time, craves that of which the system has been deprived. It is a natural instinct, and perhaps no better guide can be followed in the selection of food than the natural appetite. Variety stimulates the appetite, whether through the mind, or by direct impression upon the nerves of the digestive organs.

THE QUANTITY OF FOOD necessary for the healthy maintenance of the body, depends upon its quality and upon the amount of the bodily excretions. Excretions are removed by respiration, perspiration, lactation, urine, fæces.

An *additional* quantity of food is necessary to promote *growth.*

Food containing much water must be consumed in larger quantity than that which is dry. That deficient in its natural proportion of any necessary element, must be associated with that which is rich in the other's deficiency. Food which is poor in necessary elements cannot be ingested in sufficient quantity to make up for its poverty, without seriously impairing the health, or dwarfing some tissue of the body, if persisted in. Sheep which have been well fed in one pasture and then driven to a poorer one, exhibit the change in their wool, showing a diminished fibre, at the very point of growth where they left the best feed.

The EXCRETIONS of the body afford the best evidence of the amount and kinds of food necessary to maintain it in health. And the increasing weight of an animal also shows the quantity of food required to correspond with that growth.

Bousingault found that in every 100 parts of the elements of food given to a cow, daily, the distribution was as follows:

	To the Milk.	Fæces.	Urine.	Perspiration.
Water	10.2	34.4	10.0	45.8
Carbon	13.0	25.8	5.4	54.2
Hydrogen	16.6	34.9	4.2	55.7
Nitrogen	22.8	45.6	18.1	13.5
Oxygen	7.9	37.4	6.3	48.5
Ash	6.1	53.9	43.1	3.1
The food generally	10.3	34.4	9.9	45.4

Bidder and Schmidt have calculated the loss of the several tissues of the body in *starvation* as follows, eighteen days being the length of the experiment:

The muscle lost	42.3	per cent	of their	original weight.
Blood	" 75.	"	"	"
Fat	" 93.3	"	"	"
Bones	" 16.7	"	"	"
Nerves	" 1.9	"	"	"

This loss was passed off in the excretions, and show approximately the *necessary waste resulting from the vital processes*, which must be made up by the food in eighteen days.

I estimate the quantity of food necessary to maintain an adult in health, weighing about 140 pounds, as follows, viz:

21 oz. fresh mutton or beef, or 21 oz. unbolted wheat bread, or 70 oz. superfine flour bread, or 18 oz. peas, or 6 oz. cheese.

If we estimate the weight of the skeleton at one-eighth of the whole body, it will give 17½ lbs. of osseous tissue for an adult weighing 140 lbs. According to Bidder and Schmidt there would be a loss daily of 93 grains of bone material or about 50 grains of phosphate of lime. 50 grains of phosphate of lime is contained in about 1800 grains of dried beef, or 19 oz. unbolted wheat bread, or 95 oz. fine flour bread.

An ordinary healthy child, weaned twenty-seven months after conception, would weigh about 30 pounds; weight of skeleton, 4.75 lbs., 60 per cent of which is phosphate of lime, — 2.85 lbs.,

requiring 27 grains of phosphate of lime on an average daily, to form its osseous tissue, which would be contained in about 10 oz. of unbolted wheat bread, or 50 oz. fine flour bread. To supply the daily *waste* of the osseous tissue in the same child would require 10.7 grains of phosphate of lime, which is contained in about 5 oz. unbolted wheat bread, or 25 oz. fine flour bread.

Thus we find, approximately, that through pregnancy and lactation, a mother must ingest food for her own skeleton, and that of her child, equal to 34 oz. of unbolted wheat bread, or 170 oz. fine flour bread, or 28 oz. of fresh beef or mutton, daily. Besides the bones and teeth, the muscle and all other tissues require a considerable amount of the phosphate of lime.

It is very evident, from the foregoing calculations, that it would be impossible for a mother to *in*gest and *di*gest the quantity of superfine flour which would be necessary for herself and child; yet there are thousands upon thousands of mothers in this country who do subsist chiefly upon fine flour, and whose poor health and starved teeth, show but too plainly the effects of defective nutrition.

This is particularly the case in cities where the poor find that food made of wheat flour satisfies the hunger at less cost of money than any other food they can purchase, which is as palatable. Women and children of the wealthy classes also live on food abounding in starch, oil and sugar, almost to the exclusion of *nitrogenous* food.

The analysis of the ash of wheat already given, is taken from Prof. Horsford's monograph on "Bread Making," also the following facts in regard to the wheat berry:

"A kernel of wheat has two coats of bran or envelopes; an outer one which may be rubbed off by moistening it; an inner or true bran coat next to the outer one. On cutting a thin transverse section of a grain of wheat and placing it under a microscope of moderate power, a single row of cells will be

observed in contact with the inner bran coat, throughout its inner surface; these are *gluten* cells, and are the *only* gluten cells in the kernel. Within this circle of gluten cells are the starch cells, which occupy all the remaining space.

"The true bran and gluten constitute twelve per cent of the whole berry. The ash of true *bran* contains 6.67 per cent, consisting of phosphoric acid, phos. iron, phos. magnesia, silica, and potassa; of which 7.7 is phosphoric acid.

"The coats next the gluten cells contain a little phosphates, and alkalies, but the *great magazine of phosphates* as well as nitrogenous compounds is in the *gluten* cells."

No wonder then that Mayer, a German chemist, found fifteen times more of the phosphates in unbolted wheat than he did in superfine flour.

Johnson, of England, found ten times more ash in bran and shorts mixed, than in fine flour, viz:

Fine flour, 1.15; boxings, 4.0; shorts, 5.8; bran, 6.9.

Mege Mouries found the gluten coat to contain ten per cent of nitrogen, while the whole berry contained only between two and three per cent. This shows that the starch cells, which constitute so great a weight of the berry, are *non*-nitrogenous.

All these facts prove that the American people are casting away or feeding to animals, that small portion of the wheat berry which alone contains the elements of nutrition for the bones, teeth and muscles. The commercial bran of wheat placed under a microscope shows the gluten cells still adhering to it; and besides this, another portion, namely, the shorts, which is rich in phosphates, is also removed from the *superfine flour*. This latter is the material of which our wives, mothers and sisters delight to make bread, cake, etc., beautiful to the sight, delightful to the taste, but in which lurks the insidious foes of the dental organs, — IMPERFECT DEVELOPMENT, DEFECTIVE NUTRITION and DISINTEGRATION.

The researches of Drs. Robin and Magitot show that the

ossification of the lower jaw commences in the human embryo as early as the twenty-fifth day after conception. At the eighty-fifth day the first bed of *ivory* appears; but during the whole life of the dental bulb calcareous grains appear in its substance. As early also as the eighty-fifth day the follicles of the *permanent* teeth appear. At the one hundred and thirtieth day the crowns and edges of the canines, incisors, and the crowns of the first molars in the upper jaw are covered with *dentine*.

Thus it should be remembered that ossification of the teeth is in process from the *eighty-fifth* day after conception until *adult life*.

What an important era is this! How easily are the teeth influenced by all the causes which promote their growth to perfection, or starve and interrupt by disease their best development. Is it not an imperative moral duty to our patients and the public that we instruct them in the principles of dental nutrition and growth?

Imperfect nutrition and development of these organs may be caused by insufficient food, food robbed of its phosphates, non-assimilation, hereditary diseases, idiopathic diseases, drug diseases.

It has already been shown that there are millions of children whose blood does not receive sufficient saline material to properly develop their dental tissues. Thousands upon thousands of mothers and children do not receive food of any kind sufficient to satisfy hunger.

Hereditary imperfections and peculiarities stamp their images on the embryo dental tissues so as to reproduce themselves. Facts enough to prove this position must be known to every medical man and observer of Nature.

That idiopathic diseases cause non-development of the body is patent to all. Instead of reproduction of the tissues there is a constant cell-disintegration, causing a wasting of the body, which becomes lighter by weight, day by day.

In some chronic affections there is such a drain upon the blood of the lime salts, that all material of that kind ingested would be insufficient for the purpose of *repair*, let alone the *building* up of new dental or bone tissue. Whether this took place in the mother or nursing child it would make no difference as to its effects on the latter, except in degree.

A mother in this condition would undoubtedly part with a portion of the *fixed* lime salts in her own tissues to supply her milk with the necessary ingredients for the nourishment of bone tissue in her nursing child. This supposition is well supported by the notorious fact that many mothers suffer from dental decay, exceedingly, during lactation, the process commencing during gestation.

Lehmann states that the dentine has abnormal cavities by the absorption of phosphates, in *rachitis*.

The experiments of Chossat prove that softening of the bones can be artificially produced in animals by withholding food from them containing the phosphate of lime. Experiments have also proved that pregnant and nursing women excrete a greatly diminished quantity of phosphate in their urine. And experience teaches that fractures unite less readily in nursing women than in others. A fit of sickness often leaves its marks upon the nails of the thumbs and great toe, in the shape of depressions and ridges in its transverse diameter. This may beautifully be seen after a fit of intermittent fever that has been repeatedly checked, and returned again. The furrows show the want of nutrition, and will be wide or narrow according to the length of each temporary sickness. In the same manner I have often observed similar phenomena in the teeth, especially in the incisors.

Medicinal diseases are very mischievous in their impressions on the growing dental organs. Malformation in shape, defective blending of enamel-caps, and poorly organized dentine are believed to be traced with certainty to mercurial ptyalism of the mother during pregnancy, or to improper exhibitions of

mercury to infants and children. No greater mistake can be made than to give large doses of mercury to a child with the belief that because its constitutional effects do not appear in the gums immediately, that therefore it is innocuous to the teeth. The result of hundreds of inquiries and observations to this purpose has confirmed me in its truth. Metallic mercury has often been detected in diseased dental periosteum, and we all know that this substance has a peculiarly destructive affinity for the dental and maxillary tissues, in mercurial poisoning.

Hereditary syphilis, the great scourge of humanity, must come in for its share of obloquy as the cause of defective dentine and enamel. None know so well as the surgeon and physician the universality of this horrible infection, sending its terrible influence down through generation after generation, diffusing its baneful influence wider and wider the further it acts from its original source. Thus, must we believe the whole world to be more or less contaminated by its hellish poison. It has been satisfactorily proved that the notched incisors so often seen, are one of its manifestations. Syphilis, like mercury, acts particularly on the osseous tissues arresting their development, and causing disintegration.

If, as I believe, the fathers and mothers of this country are in a great measure responsible for the integrity of their children's teeth, how shall they so behave as to bring about such a desirable result? They should both, before conception, see to it that their own teeth are in a healthy condition. No diseased tooth should be allowed in the mouth. Those that are decayed should be plugged. Not only so, but the general health should if possible be secured. No one has a right to entail upon their offspring bodily or mental disease. No fact is better authenticated in physiology, than that the present physiological condition of the parents at conception is very frequently stamped upon the offspring, and reproduced in it. A child conceived in a

drunken state will be likely to have a drunkard's thirst for intoxicating liquors. Permit me to mention a

CASE. Mr. A. had six sons and three daughters. Himself and wife had hardy constitutions. He is now in good health at the age of eighty-five. All but one of the sons were born while the habits of the father were very intemperate. The oldest son died at 21 in a fit of delirium tremens. The next one was for many years a drunkard, but afterwards reformed. The third one died at 18 with delirium tremens. The fourth is an habitual wine drinker. The fifth has drunken sprees every few weeks. Such cases were formerly notoriously common. Insanity and other mental peculiarities are reproduced in the child. So are consumption, intermittent fever, syphilis, scrofula, etc. It is not too much to assert that the same law holds good in regard to the teeth.

After conception the future mother cannot begin too soon to take those measures which will result in the perfect development and healthy growth of the embryo in every respect. If she lives in accordance with the laws of Nature, so far as civilized life will admit, the grand purpose will be effected. A variety and plentiful supply of easily digested food, containing the elements of nutrition in NATURE'S PROPORTIONS, is the first thing that should arrest her conscientious attention. For reasons already given the *flour* of any grain should be discarded as a *factor* of nutrition. It is only allowable as a *luxury*.

Pork, whether fresh or salted, should be rejected; for it is produced in an unnatural and unwholesome manner. The swine of the yard are entirely different animals from the wild hog of the forest, which is all bone and muscle.

Perfect nutrition can take place only by digesting different elements of food in proper equations. *Fat* must no more take the place of *albumen* than must *starch*, for they cannot by any

known process, be converted, either in or out of the body, into albumen or fibrine. The food of the pregnant mother must be not only sufficient to sustain her, and indeed increase her weight, if she has not arrived at maturity, but she must also ingest sufficiently for the growing embryo. From the table of analyses already given it is very easy to choose such food as is particularly rich in the phosphates.

It has been already remarked that all food which has not been *depleted* of its natural constituents, will be suitable, provided it agrees with the taste and digestion of the mother. And the same may be said with regard to the infant when it becomes independent of the mother for its nutriment. To obtain the benefit of nutritious food, good general health must be secured. The accomplishment of this will be promoted by

Bathing and Exercise.

The skin is termed by some physiologists "an enormous gland." The sweat glands, the oil glands, and the sebaceous glands of the skin are reckoned by millions. The epidermis is constantly being cast off in the shape of epithelial scales, hourly. More than one-half of the weight of the ingesta daily received by the stomach and lungs, is cast out of the system through the SKIN.

Thus nature has provided this great excretory organ to purify the blood, by removing effete substances which have performed their office in the economy of nutrition, and are no longer wanted. Moreover the skin is intended, like the lungs, not merely as an organ of *e*gestion, but also one of *in*gestion.

Oxygen is undoubtedly received into the blood through a clean skin. Many of the lower orders of animal life have no lungs, or anything that subserves the ingestion of oxygen, excepting the skin, which fact should be an additional weight of evidence in favor of cleanliness. Without frequent baths the excretory ducts become closed up; the epithelial scales adhere

to the skin by its own exudations, and a crust forms over it which is exceedingly detrimental to health, forcing the effete matters back into the circulation, thus poisoning the blood, and making the lungs and kidneys perform the additional work which properly belongs to the skin. Among other effects, impure breath is a common result of uncleanliness. These remarks are applicable to the child after birth as well as to the mother *always.*

Exercise is the only thing which will palliate the curse of non-bathing. When exercise is taken sufficiently to produce sweat, and long enough continued, it will force open the excretory ducts of the skin, and depurate the blood of its noxious elements. But to do this effectually it should be daily, and frequent changes of clean under-clothing be had. But I can, by no means, recommend exercise to the exclusion of bathing, to a woman, and especially a mother. Do not the women of this country have exercise enough? No, not of the right kind. Household work is not sufficient. Some mothers do none of this, even. An *expectant* mother should have out-door exercise, even if she already has so much household work as to fatigue her. Exercise in the *open air* is much the more wholesome. The purity of the atmosphere and variety of scenery cause an exhilaration of spirits which cannot be obtained within a house.

Exercise in its highest sense is a pleasurable employment of the muscles. Exercise of the body which gives no exhilaration to the mind, is laborious drudgery, and loses a great portion of its good effect by its dull reaction from the mind to the body again.

Pure Air.

Purity of air is not of less importance than bathing and exercise. According to Scharling an adult man *exhales* in 24 hours 28 oz. of carbonic acid. Vierdot calculates that the amount of oxygen *absorbed* in 24 hours amounts to 746

grammes or nearly 22 oz.; nearly 4 oz. remaining in the system and combining with the solid tissues, and the remainder uniting with carbon to form part of the carbonic acid excreted.

Bousingault states that 123½ grains of nitrogen would be exhaled at the same time; and, according to Valentine, 16 oz. of water also.

The accumulating carbonic acid of the body cannot be *retained* in the blood more than about one minute without causing syncope. Death ensues in a few minutes if it is not excreted by the lungs.

Respiration in a confined atmosphere soon charges the air with carbonic acid, consequently it cannot be as readily received from the lungs as it would in a *pure* atmosphere. It acts like a river dam forcing the stream back on itself. A confined atmosphere also prevents the free ingress of oxygen, of which the system demands a certain weight hourly. The eight grammes of nitrogen given off by the lungs in 24 hours is the decomposed tissue of our muscles, etc. The unpleasant odor of a room containing too many people, which is so apparent to one just from the fresh air, is owing in part to this exhaled nitrogen. Breathing impure air, then, is like wallowing in our own filth and the filth of others.

The child in utero must breathe through the lungs of the mother, consequently *pure* air is quite as necessary for *it* as for her.

Sunlight.

That *sunlight* is the source of all vegetable life is generally acknowledged. Experience has proved it to the uneducated. But there are thousands who pride themselves on their scientific acquirements who practically ignore the great fact that sunlight is equally important to the healthy growth and development of higher *animal* life. It is true that the lower orders may inhabit a sunless world; but man could never develop his physical and

mental powers without the immediate light of the GREAT POWER of this planet.

The mode in which the sun produces its wonderful chemical manipulations in the plant is not yet fully solved; the mystery of its metamorphoses in the animal body is yet unravelled. The field is wide, and willing laborers are invited to a glorious harvest.

Mother and child should have a sun-bath daily. Naked exposure of the child's whole body to the sun for a few minutes daily, I believe, has an excellent influence on its health.

CLOTHING.

In regard to clothing, the principal points to be observed are that it should be *loose* and *warm*. The abominable custom of compressing the waist, and forcing the internal organs out of their natural places, cannot be too much condemned. The clothing should be so arranged that an equable temperature of the body will be preserved.

WET NURSE.

If the mother has a poor constitution or poor health, she ought not to suckle her child; for it is generally believed, among physiologists, that the health and constitution of the nurse, together with the quality and quantity of her milk, has almost as great an influence over the physical and mental organization of the infant as the mother had on the child in utero.

Therefore, if the mother has not the qualities of a good nurse, some one that *has* should be substituted, *and not without;* for there is nothing more unnatural or demoralizing than for a mother who is capable of giving her own child the nourishment and tender care that the CREATOR has ordained for it, from laziness, pride or self-love, to turn it over to the tender mercies of a stranger.

But a good nurse the child should have; and what are the qualities of one? A woman of at least medium height, good muscular development, not fat, well-proportioned chest, full, pleasant eye and cheerful countenance, hair of natural color, even disposition, present health sound, inheriting a good constitution, of good morals, sound teeth and healthy gums, cleanly in her habits, breasts large, clear complexion, and between twenty-five and thirty-five years of age.

It is not to be supposed that all of these qualities will always be combined in one person; neither is it to be advised to reject a nurse who cannot come up to this ideal. This much has been said that we may realize that the qualities of nurse and milk *is not a trivial matter.*

The subject of Dental Hygiene has thus been pursued up to the period of child-birth. The same principles which have been advocated as a rule for the guidance of the expectant mother and embryo, in regard to food, etc., etc., will also be a sufficient guide through the periods of infancy, childhood and puberty, to adult life.

But a large portion of this vast field is left untouched by my sickle, which, for want of time, must be left unreaped, for the present, namely, The Care of the Temporary and Permanent Teeth during the time of "shedding," which calls for all the hygienic skill possessed by the profession.

Neither has anything been said in regard to combating the diseases inimical to dental nutrition. These must be left to the department of dental therapeutics.

EDNTAL PHYSIOLOGY,

BY

JOHN ALLEN, D. D. S.

At our annual convocations we meet with men from the east, from the west, from the north and from the south, all having one main object in view, viz: the advancement of our profession.

On these occasions we expect to see something new, hear some new theory, or get some new idea in connection with our specialty. It is not my purpose, however, at present to offer anything new, but to direct your attention to a branch of dental education which involves one of the most important considerations in the whole range of Dental Science.

I allude to that branch of physiology which pertains to the human frame, but more especially to the bones and teeth, for it is an acknowledged fact that people of this country have poorer teeth than any other nation of which we have any knowledge. If this be so, it is a sad commentary upon the boasted skill of American dentists. This fact calls loudly upon us as a profession to pause and reflect upon this subject, and see whether we are doing all that can be done to save the many thousands of teeth which are annually lost by the people of this country. From thirty-seven years of practical experience and observation in dental practice, the conviction is forced upon my mind that we can do still more, and that it is our duty to do it.

We have hitherto been directing our attention to the effects rather than the causes of this national calamity — to the cure or removal of diseased teeth and the substitution of artificial

dentures, instead of trying to prevent the evil that has become so formidable. True, the advances that have been made in the curative and artificial branches connected with dental practice during the last few years have been very great. And now the time has come when another advanced step should be taken. This is urged upon us from the fact that notwithstanding all that has been done to stay the progress of diseased teeth in this country, the work of destruction still goes on; there are as many decayed teeth this year as there were last, and more dentists are constantly coming into the field to combat with the fell destroyer, and each one applying himself with increased vigor to stay the desolating tide that sweeps on irresistibly before us.

Why is this? "Is there no balm in Gilead, is there no physician there." Yes, but his efforts have been directed more to cure disease than to prevent it.

It is an old saying, that an ounce of preventive is better than a pound of cure. If we can be instrumental in preventing the decay and loss of even a small number of the natural teeth, that are annually destroyed, we can increase our usefulness as a profession. And this can be done simply by adhering to the principles which physiology teaches, with reference to the building up the framework of man, especially the bones and teeth. But in order to present a more comprehensive view of this subject, let us look for a moment at some of the fundamental principles which this branch of science unfolds, for the development of a principle is one thing, and the practical application of it is another, of still greater importance. For example: the principle involved in steam power was known long before any practical application of it was made. Scientific men had long since discovered the principle of electricity, but it was not until Morse made a practical application of it, that communications could be transmitted with lightning speed from one distant point to another; so with many of the well-known principles of physiology; although they are understood by

many, yet their practical bearings upon our well being, have been almost entirely overlooked, and we continue to go as blindly on, as if those principles did not exist. But let us look among these fundamental principles and laws of our existence, for the cause of decayed teeth, and see what we will find there. Physiology teaches us that all vegetable and animal bodies are composed of gases, liquids and solids, of various kinds and properties. The body of man is formed of some sixteen of these different substances, and they are governed by the same natural laws that control them in other forms or bodies. These substances are derived from the air, the earth and the water. Our common articles of food are known as simple and compound alimentary substances, and when taken into the system they are converted into blood. The blood *should* contain all the requisite constituents for muscles, fat, bones, teeth, etc. But if any of the constituents of which these are formed, are wanting in the food designed for man, whether it be of the fat principle, fibrine for the muscles, or lime for the bones and teeth, there will be a corresponding deterioration in those parts or organs which require them, for let it be borne in mind, that the body cannot originate either a simple or compound substance, nor can it appropriate any more of a constituent to an organ, than it has received into the system for that purpose. As well might we expect nature to produce good grain without soil, as good teeth without phosphate of lime.

The body of man is built up of different substances and composed of many parts. The framework consists of about two hundred and forty different bones, four hundred and eighty different muscles, besides the brain, nerves, arteries, veins, etc. These various parts of the body are composed of fine particles of matter, which, for a time, possess life or vital force. The vital principle of these minute particles of matter is spent in sustaining the living tissues of the body, both hard and soft.

When this has been done, and these particles of matter have

become useless, they are then cast out of the system by excretion. These must be replaced with fresh materials, fitted for use, which is done by the process of nutrition. The food, which is designed to nourish all parts of the body, should contain all the constituents of which the body is composed. When the food is taken into the system and converted into blood it is conveyed to all parts of the body, imparting to each cellular and fibrous tissue a due proportion of fresh material which takes the place of other spent particles that are being conveyed away through the medium of the respiratory organs, the skin, the urine and the lower intestines. This change of particles goes on constantly and rapidly. There is an incessant waste and renewal of all parts of the body; and in order to sustain a healthy organism, the supply of materials to these different parts must be equal to the expenditure. During the younger or growing period of life, the reception of matter into the system is greater than its loss, and the body steadily increases in weight. After the whole physical structure is fully developed in all its parts — the teeth included — then an equilibrium is maintained between the amount of matter received and expended, with but little variation until old age, when the waste becomes greater than the supply.

The sensations of hunger are simply the silent whisperings of our bodily organs for fresh supplies of food. When nourishment is taken into the stomach and converted into blood, this fluid circulates rapidly through every portion of the system, conveying to the nerves phosphorized compounds, to the muscles sulphurized compounds, and to the teeth, bones, etc., mineral compounds. No one kind of diet contains all the necessary constituents for the different parts of the body. The milk of the mother contains all the constituents the infant requires, which is derived from the food of the parent. A mixed diet is required in order to provide for all parts of the body and to effect the proper chemical union of the different elements con-

tained in the food which is essential for organic structure, that each particle of matter may be of its proper kind, and deposited in its appropriate place.

If any of these different constituents are wanting in quantity in the food, the equipoise between the waste and supply is not maintained, and the tissues whether hard or soft, that have not received their full supply of new material, lose weight faster than the food renews it; consequently they shrink, fail and pass off as effete matter, or close the scene in death.

As with the other tissues of the body, so with the bones and teeth; the same general law of waste and supply prevails in all parts of the system. If the food for a child does not contain a due proportion of the mineral elements, the teeth will not be well developed, and being deficient in their structure, will soon show signs of early decay. The young require more calciferous matter than adults, in order to meet the great demand occasioned by the growth of the bones and developing of the teeth.

If there be abundant supply of earthy matter to fully meet the demand, then instead of soft, chalky teeth as we now have, they will be dense and firm in their texture, and capable of resisting decay, so long as a due proportion of mineral supplies are kept up. When the teeth have become well developed, and densely formed, they will, under ordinary circumstances, maintain their integrity until their supplies are diminished, or suspended. If this is done, then, as particle by particle dies away, and no fresh supplies are furnished to take their places, decay is the result. But we are told by some dentists that this mineral element in the food is not important after all, and that we may bolt and sift it all out of the flour, or other substances which contain it, without detriment to their nutrient properties, This may be true to some extent, with reference to flesh and fat, but not as to bones and teeth. They also tell us that the system can elaborate whatever it requires from other constituents

upon this point let us refer back to fundamental principles. They teach us that the body does not possess the power of converting one substance into another. It can compound, and appropriate substances to the various parts of the system, but it cannot originate them. It cannot transmute hydrogen into nitrogen, carbon into phosphorus, or fat into lime salts. If the mineral element which forms and sustains the hard portions of the teeth is wanting in the food, these organs will suffer just in proportion to that deficiency. Upon this point, Dr. Paul says. "We have been too much in the habit of considering that nature furnished her own materials and man had nothing to do with her operation."

"The potter cannot fashion the bowl without the clay, neither can bone be formed without earthy matter. The system must be supplied with the various constituents required for the body, some for fat, some for flesh, skin and various other tissues, and some for bones and teeth, which are held in solution and carried away by vessels adapted for that purpose, and deposited atom by atom, until they are so compacted together as to become solid bone, or hard, stony formations for the teeth." Dr. Paul further says, "If we are to expect the stalwart frame of man, or the enduring, firmly knit, compact and healthy physical constitution of woman, the organic and inorganic or earthy compounds of which that frame is composed must not be denied. Nature must be supplied or nature will fail."

Again, when contending, as we have on former occasions, for the retention of the mineral element which exists largely in the hull of the grain which we use for bread, we have been met by the argument that the amount of earthy matter was so small in this portion of the grain that the difference between bolted and unbolted flour, so far as the teeth were concerned, was not perceptible.

Upon this point, Prof. Johnson, in his official report, says, "that the whole grain is one-half more nutritious than fine flour."

This report also shows the very large proportion of bone material which is contained in the bran. In the same work Mr. Brentz says, "The ordinary weight of offal is from 65 to 70 lbs. to each barrel of flour. Now, if we estimate the earthy constituents to be two-thirds of the offal or bran, we must consider that there is an actual loss of these important constituents which might be retained in every barrel of flour, of forty pounds." Again he says, "If we estimate that every child shall consume annually one-half a barrel of flour, then we find that by the use of superfine flour, as commonly used in families, the child is deprived yearly of twenty pounds of those earthy substances which are required to form the bones and teeth." "When we speak of a child consuming half a barrel of flour annually, it appears a large quantity; but when we reduce the same to a daily allowance, we find that is but a little over four ounces per day; and every parent must know that this would be a very small amount to limit children, yet we see how large a quantity of the bony material would be added if unbolted flour was used for bread instead of the present superfine flour. Now this is a great loss of the most valuable constituents in one of the principle articles of food for children. In conclusion, allow me to urge upon our profession the importance of looking more closely into this matter, and let the five thousand dentists of this country raise their voices against the discarding of this mineral constituent from the staff of life.

REPORT OF COMMITTEE ON PATHOLOGY AND SURGERY.

BY

W. H. ATKINSON.

After a survey as complete as the circumstances of the case will permit, the following conclusions may be pronounced:

I. All true authority resides in the mind capable of correctly interpreting nature.

II. All correct surgery coincides with, rather than opposes the normal energies of the body.

III. Hence, a conservative is the only legitimate surgery.

IV. When the principles underlying a thorough and correct apprehension of a really conservative surgery shall have been understood, correlated and taught, ninety-nine per cent of the necessity for surgical manipulation will have been annihilated.

V. So long as an injured part, soft or bony, is capable of being supplied with fresh arterial blood, it may be resuscitated; but just so far as this supply is permanently prevented from entering the territory involved, necrosis is sure to supervene to increasing extent, if the points first devitalized be not promptly removed.

VI. All advance is made through the things we suffer.

VII. Medicine and surgery, no less than dentistry, owe much of their present elevation to the reckless blunders of their practitioners.

VIII. Any agent capable of unfavorably modifying physiological activity is a *poison* in the exact ratio of its power to do

this; when favorably sustaining physiological action, it is a *food;* and when it neutralizes pathological agencies, it is an *antidote* — a medicine.

IX. The time is fast approaching when we, as dental surgeons, will conserve pulps and parts of pulps as anxiously and successfully as the other organs and parts of organs of the human body.

An exhaustive report upon even a single example of pathological manifestation involves the focalization of all knowledge, of not only pathology, but also real physiology, or normal function; and, so far as ultimate or primate actions are concerned, is now quite among the impossibles to even the highest scholarship of our most indefatigable workers to demonstrate to ordinary apprehension.

What, then, shall be done? Shall we listlessly fold our impotent hands and do nothing, because we cannot accomplish the most magnificent results by a single effort at solving the entire protean problem of disease?

In all ages, men have been inspired with the desire to secure perpetual youth — in a word, to find the means of immunity from pain and perpetuity of pleasure; but that grand catholicon — the universal panacea — has pronouncement, as yet, only in the magnificently bewitching ideal! It is frequently said to be of little use to be able to recognize a disease for which we know not the remedy. In the abstract, this would be true; but, as it is usually meant, it is far from it, for it signifies a remedy in the shape of a medicine specifically adapted to antidoting the mischief, and not a knowledge that the disease had a certain course to run, and then die by exhaustion of the power of the virus causing it, or the susceptibility of the system to respond to it. Poisons expend themselves by limitation resultant upon entering into combination with the tissues, or by diffusion and dispersion to remote distances in the fluids favoring their escape from the

body by profluvia, or their infinitesimal attenuation. Some poisons act with such potent energy as to destroy life instantly, in an incomprehensible manner; while others lay the foundation of pathological states that may lay dormant throughout a lifetime — nay, a whole series of generations, only awaiting the favoring conditions to break forth in all their destructive energy in the over-fed and under-worked, and under-fed and over-worked, or under-rested, progeny who have inherited the molecular disability. Thus, it is apparent that foods become poisons and poisons foods, according to the circumstances of the system into which they are introduced. This will be more and more clearly seen as we progress with the detail of the physiological principles and movements out of which our apprehensions of pathological manifestations take their origin and means of admeasurement and differentiation.

At the suggestion of the Chairman of the Committee on Pathology and Surgery, I will endeavor to say something upon the past and present apprehensions of the profession respecting syphilis.

Probably the great underthought of all the past and most of the present, is, that this disease owes its existence to a poison, ("materies morbi" — "virus,") varying in degrees of intensity and quantity of power! That it is, in the main, propagated by unclean contacts is indisputable; but that these alone are capable of originating it in an otherwise healthy organism, leaves us in the dark as to its origin in the first case. Just what is meant by intensity as opposed to quantity is not so easy of comprehension and definition. For susceptibility of the system upon which it is inoculated is involved in the inquiry no less than many other conditions of temperament of the body, temperature of the part, and many modifying circumstances, without a knowledge of all of which we are unable to diagnose a case or calculate its character, progress and termination.

It will probably be most in accordance with prevalent ideas to treat it as a germ — a seed — the stages of evolution of which makes its character and presence known by the effects produced in the body. All germs require a favorable nidus in which to display the powers of the typal force which formed and is holden in their mysterious grasp.

The grains demand at least three conditions, viz: light, heat and moisture, and flourish best in good air and plenty of soil.

Just in what the physical body of the germ of syphilis consists we will not pretend to say at this time; but that it holds specific relations to the neural-(mucoid-)sea, in the soft and hard parts of the body we have the tangible testimony of sight and sense.

Whether the so-called stages of primary, secondary and tertiary "syphilization" are due to the specific character and strength of the virus, or to the varied resistant powers of the diverse tissues it invades, admits of some dispute. Lest some objection be made, I will state here that the term "syphilization" will be used to denote the *saturation* of the system by the virus, or *malign presence* upon which the disease denominated "syphilis" depends, and not to signify any technical methods of inoculation or number of repetitions thereof necessary to exhaust the susceptibility to the infection of syphilis or other cachexia for which inoculations were or might be invoked.

Were this germ proven to possess specificity of size, form and solidity, it were an easy task to calculate the highways and byways through which it could pass with ease or with effort, and the degree of vigor with which it would coincide with or differ from and supplant the normal nutrient movements of the parts into whose territory it was admitted. But until we are blessed with this insight into the incubation and development of this potent presence, we must content ourselves with annotations of such results as do come within reach of our present

power of cognition, setting them down as parts of the process of the demonstration so certain to be fully pronounced in due process of procedure.

Syphilis, at present, is recognized alone by the ravages it effects. The regularity and similarity of these, as they present to the observer, are relied upon as testimony to the identity of the cause producing them. Uniformity — identity of manifestation — is necessary to diagnosis; hence the value of the diagnosis is exactly commensurate with the degree of intelligence of the observer.

Chronothermal conditions have such modifying influence upon functional manifestations that a general rather than a strictly special identity and uniformity is alone attainable, upon which to base our diagnosis that "these ravages depend upon syphilitic poisoning." The important effort at generalization in nosological arrangements, reducing all disease to a unitary origin and type, so ignominiously scouted by the many, is nevertheless worthy of the gravest consideration.

Let us inquire, then, "Is syphilis the unitary *door* and *type*" through which all disease enters, and toward which every path ological manifestation points for primal and ultimate solution, explanation and successful treatment.

If all "solids arise from and depart through liquefaction," and "all oils (liquids) are but concentrated gases; and these condensed ethers; and these but spirit in like constraint," we ought to be able to deduce the tremendous equation that "all things differ but in degree," of differentiation of spirit-affinity! This would, if clearly apprehended, unravel the whole mystery of "chronothermalicity," "infection," "disinfection," evolution, culmination and decadence or death (extinction) of all bodies and of disease. No less than that, all cure, and truly scientific management of bodies laboring under aberrant currents of force, depend upon modifications effected in the unseen "typal spirit-presence," constituting the motive energy of all bodies

seen and unseen. Just so soon as this knowledge is fully attained, by plodding detail of observation, or by instantaneous inspirational obedience to that which energizes all, a word, a touch will be (shall I not rather say *is*), all that is necessary to exorcise the malign presence, and then the body spontaneously returns to a state of health.

If then, most interior spirit-affinity, contact and blending be the only source from whence arise the rôles of functional activity denominated *ease* and *disease*, with what sedulous care ought we to study our physical, mental and spiritual natures; so that by the knowledge of these equal affinities and necessities, we may be able to conserve goodness and use and avoid the deteriorating contacts and blendings which have thus far held the dominion among the mass of mankind. From which dominion of contacts and blendings arise, individual being, suffering, development and dissolution of personal bodily presence in prolonged horror of inharmonious detail, in all departments of existence, each struggling for the uncontradicted autocratic — instead of the common-concurrent-jurisdiction of the field of action.

It is currently reported that the "fear of disease" is a potent restraint upon otherwise reckless characters. Let it once be firmly established in the minds of men, as it is indisputably written in organology, that all associations remote as well as nigh leave their unmistakable impress upon the whole being to the competent apprehension, the more occult the more insidious for the time, and dangerous in the outcrop, and we will no longer see searching scrutiny into the origin, cause and character of pathological manifestation ignored by those who profess to have a mission to make, or modify the destinies of individuals and communities!

That these intensely heterodox and "hated pronouncements" are not the "chatterings and tergiversations of a mind diseased," permit the proof out of the mouths of those who most

strenuously oppose them, by referring to the "real orthodoxy" of the present, in which it is everywhere said that *infection* and *disinfection* obey the laws of *thermal motion*, and have their range of action between 32° and 212° of Fahrenheit's scale — above and below which they are "nil" in their ability to manifest themselves! This doctrine is the sum of the whole labor upon the intensely interesting question of "Quarantine!" and proves that currental *in*flections and *de*flections make and mar the condition of man in health and disease!

A specific poison, capable of deranging currental equipoise in the human body, enters the periphery of the mucoid-sea beneath the attenuated dermal sheath, near the mucous openings: And dies by conversion into accelerated normal nutrition, or rapidity of diffusion, or changes local molecular movements producing stasis in the sea, and accumulation of her waters in a bleb in the areolar tissues, which is incipient chancre or pock (pock*et*) in which the germ rapidly multiplies in the form of pus globules and fluid pus on all sides of this cavity: Inviting influx from the juices of the flesh in the immediate neighborhood, extending stasis and induration farther and farther until the outer wall of the bleb or cavity bursts from tension or external violence — scratching or other mechanical interference, thus displaying the unmistakable character of "lues venerea," or syphilitic chancre. "And dies by conversion" into normal nutrient force, "or by rapidity of diffusion" throughout the mucoid sea, modifying nutrient actions so little as to only slightly change the character of the great fountain of the vital pabulum, upon which the system subsists, which change is so very insignificant that it attracts no attention, and hence passes insidiously into every possible variety of derangement of nutrient activity, laying the first stone in the base upon which a multifarious Pathology is built — so difficult to satisfactorily trace to this unitary origin of evil!

It is thus seen that there is no safety to susceptible persons

in any contacts of this virus; for although there may be no perceptible pock, or primary local affection, the "diffusion" of the "evil" may be yet more destructive to the well-being of the organism, than in case of regular primary infection, and regular development of the more common (according to past and present doctrines) effects of the virus; by originating ambiguous derangements, hard to be understood, and therefore difficult of cure.

The unitary primal necessity to infection, is local debility of dermal and hypodermal cells, the change in whose walls permits the ingress and egress of substances which the normal state would effectually exclude, or convert into normal force; and thus their interiors become increased or reduced in size, so as to destroy the proper tension to favor equality of the currental movements of the modifications of force, the exactitude of which constitutes normal nutrient activity.

Pus, tubercle, and cancer, are but *irregular* modes of obliterations of primates (filaments and cells) in forming and nourishing tissues; the origin of all of which we ought, now, to be able to trace to *incongruity* of copulative conjunctions in cells, tissues, organs and systems, of the currental forces that produce and sustain all these in individual and associate existence.

Where the contest for dominion of the nutrition of the part is exactly balanced in the force or power of the diverse energies battling for the field, they mutually neutralize each other, and death (necrosis) of the territory infected is the consequence. Instance the sloughings of territory invaded by swellings in bubo, so common, and so tedious of restoration to health.

When vital energy of a part is in its highest state of functional activity, the virus has no affinity for the already harmonious currental movements; and in such cases infection does not "take," as the phrase is. But where inharmony has already partial residence in the locality, affinities for diverse (poisonous) currents do exist, and will display themselves whenever

circumstances bring a virus within the proper distance, or sphere of influence.

Under such circumstances of debility in nutrient force, the virus is readily admitted, and rapidly diffused throughout the sea of pabulum, in which a modified digestion thereof takes place under this new dominion, and a syphilitic cachexia is set up throughout the extent of its ethereal territory, thus impressing the constitution with the *primary effects* of the poison, without the intervention of the digestion of the altered pabulum in the circumscribed sea, of a bleb, blister, or incipient chancre, as is the more common observation in practice.

Thus the whole sea of the juices of the flesh (mucoid sea — neural sea) is made to glow with the rife fermentation of the chancrous poison, instead of the insignificant interior of the little pock(-et) at the point of contact of the inoculation of the infectious presence. And we thus have the so-called "secondary" manifestations of syphilitic poisoning, involving the soft parts and skin in general, and the glands in particular.

The next stage is nothing more than the expression of this one just described, confined to the mucoid sea in the porous and cancellous portions of the bones of the body, and is the so called "tertiary" form, and is long in running through its course, and varies much according to circumstances of constitution, age, sex, treatment, etc., etc.

Of that form of venereal disease variously denominated "syphiloid," "chancroid," "soft chancre," etc., etc., the oral surgeon has but little concern, and so it is thought best to keep out of the muddle of that controversy. Although close attention to what has already been said will indicate a correct classification and understanding of this form, also.

In reply to the question, why certain poisons and cachexiæ prefer particular tissues and localities in the bodies they infest, it must be acknowledged that the range of recorded observations is as yet too meagre to enable us to demonstrate satisfac-

torily the analysis and synthesis upon which the proof of the philosophy depends. However, the facts are abundant and will soon find explanation, if each will but record and expose to others the views that spontaneously arise respecting both the facts and the philosophy, instead of continuing to perpetrate blunders of the head and hand and conceal them lest others also see the weakness, not to say wickedness, that stands in the way of advancement to higher morality and better ability!

If new and improved apprehensions of pathology and appropriate surgery based thereon, are not generally accepted by those supposed to be competent judges of such matters, we need not despair, for all present orthodoxy was once in the same dilemma, and it has been able to work its way to recognition.

It may be pertinently asked, by those who advocate the old ideas of primary, secondary and tertiary "forms" of syphilis, how it comes that identity of treatment of these conditions does not result in equal promptness and certainty of cure, if indeed these manifestations are but the "primary" effects of the poison in the *various tissues*, as indicated in this paper?

An intelligible, complete reply to this query would constitute the very essence, germ or basis of all knowledge upon the momentous questions of healthy and diseased actions and their proper management, and would reveal the peculiarities and possible differences in the occult movements in every form of cell, tissue, organ and system.

The attempt to perpetrate this equation in our own strength and acquisition of learnings in the recorded observations of our predecessors would smack of egotism or foolhardiness. Therefore let the attempt be made in deep humility and implicit reliance upon (the intensity and charity of mind resultant upon) the *inspirations* that are born of our painful necessities, — the source and fountain of all perceptions, past, present and future, of the learned and unlearned inquirers, — for help to

reduce facts to the philosophy by which alone they can be satisfactorily explained. Will you permit me to make this *basal statement*, viz: The germs from which healthy bodies are capable of being evolved are *pro*duced by the *satisfactory* equation of plus and minus quantities of force within an amorphous solution of *sun*-and-*earth* presence, called chaos, which is true planetary substance, and the first step or stage in individual bodily presence or *ex*istence. When the equation of force is not *quite* satisfactory, an imperfect or unhealthy germ is the product, and the body capable of being evolved from it will possess an hereditary tendency to pathological manifestation, requiring the best possible regime to overcome or keep in latent state.

The *nourishment*, as well as the *reproductions*, of tissues, organs and beings, is effected from this same fountain of pabulum (or chaos), under the guidance of typal power, which had its origin as stated above, the conditions of which made it healthy or debilitated, and limited it in possibilities of duration, size, generic, specific and other characters. It is evident, then, that concurrent jurisdiction or dominion of sun-and-earth energies constitute the measure of health, and that any discordance in this working together in the body, soul and spirit, will institute poisonous or pathological states of the being in whom they occur.

As there is a difference between the healthy and unhealthy constitution of germs, so, too, there is a difference between sickening and death of the bodies capable of functional action. Debility renders infection (demoniac dominion) possible, and *dis*infection (exorcism) is most promptly effected by antidoting the poison and supplying nutriment to the weakened organism. It may now be asked why mercury has thus far been *the* remedy in syphilis; the answer to which should simply be, because it has been known to have the power to break down, deoxidize the debilitated, poisoned cell-structures into an amorphous, chaotic state, thus rendering purgation of the juices of the flesh

an easy effort to the system, ridding it of the malign presence beneath the skin in the mucoid sea by the profluvia, diaphoresis, ptyalism, catharsis, etc., etc., following its administration. When this purgation is complete, it only remains for the vital energies to heal the local lesions of dermal parts, and the effects of the poison have no further active agency. But, when the poison has found lodgement in the deep glandular and osseous structures, effecting death of cellular interiors, the mercury is not alone able to cause the solution and removal, by profluvia, of the dead and debilitated primates, and hence the so-called secondary and tertiary indications which result from obstructions, causing abscesses in glands, which must be discharged or encysted, and also causing necrosis in bones, which must be dissolved and washed away, or continue to be a source of irritation until removed by mechanical means. Thus it is clear, that the irritations and tedious consequences of the failure on the part of the systemic powers, or the surgical attendant to remove necrosed parts in glands and in bones, depends upon this inability or neglect, and not the specific virus of syphilization.

The remedies relied upon to remove these obstructions in glands and bones as the results of syphilis, viz: the iodides of mercury and potash are as potent solvents and deobstruents in cases of the so-called non-syphilitic as syphilitic necrosis of glandular and osseous tissues.

And now, from all that has been said, is it not easy to deduce the correct treatment of syphilis, viz:

For incipient chancre, the abortive extirpative treatment by caustic, scissors or knife. (As a caustic the saturated solution of pure iodine in creosote is preferred.) And good and sufficient feeding to secure pure and abundant arterial blood to renovate and sustain the system.

For fully developed chancre, add to the abortive treatment constitutional mercurialization (the protiodide of mercury is preferable) and a nourishing regimen.

For glandular obstructions and eczematic eruptions, push vigorously the mercurialism and decided increase of the good feeding coupled with scrupulous cleanliness.

For periosteal and bony obstructions, heroic doses of iodide of potassa, and prompt and decidedly deep incisions to evacuate local obstructions beneath the periosteum, and in the corium of the shafts of the long and other dense bones, following up the supporting regime.

There are two distinctly marked advances upon "orthodox," general and oral surgery, viz: First, the conservation and rapid reproduction of bones when involved in injuries that formerly predetermined their ultimate loss; and, second, the conservation of bruised and inflamed soft parts, by local relief, induced by free incisions to remove extravasations; and support, to favor fresh influx of pure blood, by which rapid repair is effected.

In the practical expression of the first, it is only requisite to remove so much of the already necrosed bone as is fully deprived of the circulation of fresh blood, by enucleating it from the soft parts. After freeing so much as desirable by the spud and saw and file or forcep, proceed to rasp, file, or scrape away all the dead and dying parts until the fresh, living bone is invaded, which is known by the oozing of the bright, arterial blood from the cancelli and haversian canals. Then proceed to wash out the debris and blood, after which a solution of chloride of zinc, 20 grains to the ounce of water, should be injected to arrest the bleeding and induce an exudate of blood plasm with which to unite the severed parts by the calloid mass out of which the new tissues take their origin.

One word more about dressing: Be careful to do no more than remove effete matters that may appear in the locality. For, if not careful to only do this, the plasm and soft granulations will be liable to be washed away by the force of the jet from the syringe, and thus retard the cure by an over-treatment, which is, if anything, worse than under-dressing, both of which should be sedulously avoided.

The second example of advance in doctrine and practice consists in that which has been denominated "abortive treatment of inflammations" by mechanical and medicinal means.

Dr. W. W. Allport, of Chicago, has reduced this to a definite and comprehensible manipulative proceeding, so far as exposed pulps and cornua of pulps are involved, in his admirable method of extirpating the exposed part with the rapid, delicate cut of a peculiar instrument, and the freeing the lips of the wound from attachment to the surrounding dentine, by which proceedure the lips are allowed to fall into contact by the resilience of the tissues, thus securing union by the first intention. This process is eminently conservative of the life of the pulps submitted to it, as is now verified by a number of cases, which have proved successful in preserving them for the performance of their proper function, whatever that may be. At least one case of loss of half the bulbous portion of the pulp of a superior incisor has resulted in not only conservation of the remaining portion of the pulp, but the force resident therein has thrown out and organized a complete protection of secondary dentine. This is testified to by Dr. Allport himself, Dr. M. S. Dean and Dr. L. P. Haskell. I myself, saw the same case at the point, when the plasm out of which the calcigerous protection has been evolved, was occupying the chasm across its deepest portion, in contact with the living, pulsating pulp, which could be distinctly seen through the beautifully transparent shining colored mass which has so condescended to be wrought into the much coveted and now attained calcareous protection to the delicate tissues beneath.

There are but two methods of resisting the advancement claimed, viz: First, to deny the facts, and, second, to say "they are nothing new."

It is well known how discourteously the writer of this has been treated by those who counted themselves the embodiment of knowledge, for no other reason than that he advocated the *possibility* of that which is now so triumphantly proven.

DENTAL SURGERY.

BY

C. RICHARD BUTLER, D. D. S., M. D.

I conceive that all the diseases of the dental organs — and operations required as remedial for the same — come directly and properly under this general head.

The attention and fine skill of the dentist is called for from infancy to old age. How much may the dentist do to soften and lessen the long and anxious vigils of the tender mother as she watches her precious bud in its struggles to unfold and bloom forth in all of its typal fulness and beauty!

The flushed hot cheeks, and restless movements of the child while awake, the nervous, twitching movements of the muscles of the face in its sleep, with at times a sharp cry, indicate suffering or acute pain in consequence of the vital throes of a dental organ struggling to force itself through the gum or tense mucous membrane; and if the physiological condition of the case is carefully noted, the parts will be found hot and tumid, the dental vessels engorged with impingement of the dental nerves.

One of the principal reasons for the great disturbance in the dental system during the eruptive stage of the milk teeth, is the fact that the vital forces are especially active in their efforts to build up the ossific structure of the maxillary bones, as well as the teeth.

The parts are extra vascular, and in a formative stage; the blood being loaded with lime salt, more readily clogs the radicals and capillaries; and if from any cause the little group of

active, artistic vitalities become impaired, and a stasis once established, the debris must be cleared away with the knife. The pathology in the case is clear, and also the treatment.

The mother may shrink at the idea of having the knife applied to the gums of her darling baby, but when the dentist with a few well-timed words of assurance explains the necessity of the operation in order that more serious difficulties may be averted, she will submit the case to his judgment and skilful hand.

A crucial incision should be made through the tense mucous membrane and gum over the crown of the erupting tooth, to deplete the parts that have become inflamed and relieve the overtaxed radicals and capillaries. From the irritation of the dental nerve filaments which run along the dentinal tract the sympathetic has become affected. Thus, from a local trouble, the brain, stomach, bowels, and in fact the whole system of the child, becomes deranged and demands prompt and active treatment.

Individual cases might be cited in detail, of interrupted and suspended dentition with all its concomitant effects.

But the cursory view which I have taken above may serve to stimulate the minds of those that are ever striving to be ready to meet the demands that are so frequently made for our advice and skill as members of a noble profession and workers in the great field of alleviating human suffering. Whoever has made this his choice profession, must never be slothful, but ever active and thoroughly qualified to diagnose accurately, and to prescribe and apply the remedy that will bring the most prompt relief.

> Who gives to others shall himself
> Receive as much again;
> The clouds, by seas and rivers fed,
> Return the gift in rain.

It is our prerogative and duty to practice conservative surgery in our efforts to save the dental organs, whether they be of the deciduous teeth or the teeth of replacement. Much can and

should be done to keep in as healthy condition as possible the temporary teeth which are nature's fulcrums for the expansion of the arch, if not prematurely removed by disease and extraction. The sentence of decay and death has been pronounced upon human organs as well as systems; if it were not so, our services would never have been demanded in ameliorating the sufferings of the human family.

When the deciduous teeth are attacked by decay, the disease many times is rapid and seems to defy our efforts to control it. This is not unfrequently the case even with children belonging to the better class of people.

The animal matter predominates so much that they often decay early, and the pulp is so large that the disease soon encroaches upon it, giving rise to acute pain and long-continued suffering to the little patient, and we are often importuned to remove the offending tooth or teeth at once. But there are many modifying circumstance that should have an influence in such cases, as the condition of the surrounding parts, class of tooth, and age of the child.

The simple fact that a tooth aches is no valid excuse for its removal; if it be from an exposed or dying pulp, very prompt relief may be obtained in most cases by taking a sharp excavator and with a few dexterous strokes, clip the irritated pulp; the starting of the blood will give relief, then apply some soothing application; remove the pulp, and insert a temporary filling; if the tooth be not filled it will soon break down and be gradually thrown off by nature. The great effort, however, should be to retain these teeth with living pulps, for if the pulp be destroyed the process of absorption of the roots is arrested, even after it has commenced, and the root remains unabsorbed and must be removed by some other means. In the temporary teeth, partial and complete necrosis of the roots occur much more frequent where the pulp has been removed mechanically or by disease, than in the permanent teeth; for in

the young subject there is not that persistent life force in the periosteum which is requisite to keep up the vitality and health of the tooth after the pulp has been destroyed.

Cases of abscess-necrosis and exfoliation of the alveolar process occur, demanding attention and treatment. A case of suppuration and abscess, from an inferior temporary molar, resulting in external fistulous opening, was brought to me last winter. The patient was a little boy about five years old. I removed the offending tooth and washed out the parts with warm water, then dressed with a mild solution of iodine and glycerine, with instructions to use cold-water dressing as the side of the face was considerably swollen. In three or four days the little patient returned, but with no signs of improvement. A deep incision was then made into the original abscess, reducing the trouble to an incised wound; when considerable matter had escaped, the wound was thoroughly washed out, and a piece of lint with simple cerate was inserted. This dressing was repeated twice and the wound healed nicely and left no perceptible or unsightly scar. This case had been aggravated by the application of warm poultices to the face, which increased the suppuration and invited the matter to the external surface. The general constitution and health of the child was good. Several cases of dental fistula have come under my notice in adults, and have been successfully treated in a similar manner. I think the knife preferable, with mild after-treatment, to escharotics in these cases, as the result is a less unsightly scar. We should always have an eye to the artistic in our efforts, especially in operations about the face. Harelip and cleft palate come legitimatly within our sphere of operations as dental surgeons. We should understand the principles of surgery in all such cases, and be as skilful in the use of the knife in plastic surgery as we *claim* to be with the excavator and plugger in operations upon the teeth.

THE SACRIFICE OF THE HUMAN TEETH.

BY

J. S. KNAPP, D. D. S.

Mr. President and Gentlemen of the American Dental Association:

It is with much delicacy that I appear before this Association, as the representative delegated by the recently organized New Orleans Dental Association.

While gratefully acknowledging the kindness of my reception, permit me to express my thanks and offer to you the kind greetings and congratulations of the Society I have the honor to represent. With your permission, I will present for your consideration a few thoughts on the Sacrifice of the Human Teeth. By the expression used, I do not mean the disfigurement with a three-cornered file, that prevails in some parts of Africa; the wanton extraction of sound teeth from the mouths of the poor people in enlightened England, to replace decayed ones in the mouths of the rich, nor their gradual loss in localities where the means for their preservation are not at hand. I believe you will agree with me that in our country, where the greatest improvements in the dental art have been made, the loss of the teeth is far too extensive, and, to a great extent, unnecessary. With a knowledge of those diseases affecting the origin and development of the physical constitution, we would learn that their ability to resist disease and decay depends on their natural structure. The constitution, carrying in its composition the power of resisting disease, the character of the teeth, in like

manner, depends on the quality of the materials from which they are formed.

We cannot expect a good pudding or cake to be made from bad materials; nor can we expect bread, made from bad ingredients, to assist in giving the best qualities to the *teeth*, *bones* or *muscles*. I am not prepared to enter minutely into this branch of my subject, merely adding, that it is plain to my mind that the practice of separating the coarse from the fine particles of wheat, rejecting the former and using the latter, so prevalent since the great improvement in flouring mills, is one of the prolific causes of decay. According to chemical analyses, the coarser particles contain more of those elements requisite to make a good and enduring quality of bone. Teeth, then, that are not well organized cannot resist other minor causes of decay. Exercise is essential for the development of good, strong muscles; and we find that the teeth, to be well constituted, must have work to perform. This exercise may be obtained by the thorough mastication and comminution of food; the food should be plain, substantial, and possessed of proper elements.

Physicians, knowing these facts, should be more particular to impress a knowledge of them on the minds of those under their care; and dentists should avail themselves of every opportunity to impart this useful information to their patients. It may be said that, in the United States, we are the victims of *poor cooks*. The proper preparation of food does not receive from physicians, dentists, or the people, one half the serious attention that its vast importance demands. The difference in those practising the culinary art is such that, from the same materials given, one cook will prepare something good, palatable, wholesome and nutritious; while the other will produce a miserable, unhealthy and indigestible compound. This bad cooking, the rapidity of eating, or rather bolting, our food, and want of proper exercise, are sufficient to make us deserve the name we have received, — "A nation of dyspeptics."

If physicians and dentists will strive more faithfully to impress on their patients the importance of these subjects, and their bearing on the development of the bones and muscles of the rising generation, many teeth will be saved that are now unnecessarily lost. I have, I trust, in general terms, pointed out some of the causes of the premature loss of the teeth, and hinted at the remedy.

Another reason why many teeth are sacrificed that might have been saved, under the care of a skilful operator, is, the careless and imperfect operations performed on them. Admitting we live in an age of improvement, and recognizing the advancement made in the dental art, especially in the Northern States, I would ask: Is it not lamentably true that thousands of human teeth, that might be preserved for years of usefulness to their possessors, are needlessly replaced with artificial ones? Is the desire to please patients, regarding appearance or cheapness, to regulate our professional acts? Should cupidity govern us in questions of professional integrity? Personal observation and the experience of others lead me to believe that this practice is more prevalent at the North than at the South — perhaps on account of the greater facilities for extracting without pain, and the making of artificial teeth in all the improved methods.

The remedy for this unnecessary destruction, is for every dental operator to follow the dictates of a conscience cultivated in the right. Many attempt the duties of a dental operator before qualifying themselves; and, I am sorry to say, many receive pay, year after year, for plugging teeth, who never in their lives have made one good plug. The influence exerted by the dental schools and associations, with the desire for improvement so markedly manifest in our day, I am glad to notice, will in time overcome this evil. While we have many fine operators compared with those of former years, I regret to see, among those so-called good operators (living in our large cities, where

we expect intelligence and science to prevail), evidence of such miserable operations as are calculated to make the heart sick, and make us pity the victims of such mischievous quackery.

There are, of course, all grades of plugging, from the poorest to the best, notwithstanding ignorant patients may deem all plugs alike. I regret most deeply that there are so many teeth plugged receiving little or no benefit from the operation, and this is an unnecessary sacrifice of the teeth. Many become so conceited with a slight knowledge of our art, that, boasting of the excellence they have attained, they claim to be unequalled.

The effect of this conceitedness prevents improvements. This class of dentists, by their miserable attempts at operations, and through their vanity and ignorance, annually sacrifice thousands of teeth. To state facts wherein your experience equals mine: you have observed, frequently, teeth tolerably well constituted, but recently plugged on the grinding surfaces of the molars. The orifice of such cavities, small, never having been enlarged to admit of thorough excavation, cleansing from decay, or the introduction of a proper filling, and you discover signs of decay before removing such an imperfect filling, and far more after you have removed it. Indeed, the decay was so covered up, that you hesitated whether to advise the removal or not; but as you advance, the *dirty work* done but a few short months speaks for itself; and speaks, ah, how poorly, for him in whom your patient had such confidence. I have taken this because it is a plain case; and do I exaggerate when I say it is of frequent occurrence? If so, tell me I speak not the truth. The attainment of equal skill in manipulating, or correctness of judgment in difficult cases, is not to be expected; but any man who continues to fail in such plain, easy cases, ought at once to drop the plugger, and undertake that in which he may have better success. He thinks he did not fail. The gold did not come out till it was taken out by another dentist. Is the aim merely to make gold stay in a tooth, or is the object of filling

teeth to arrest decay? If such fillings as the class mentioned will stop decay, then he has succeeded, and should not be slandered!

To make a perfect filling on the buccal side of a wisdom tooth, the crown bulging, the decay deep and extending to the posterior side in a mouth rather unfavorable, without bold filing, would to me be a matter of absolute impossibility. If others can do it I should be happy to hear from them, and to see them do it. I have seen many instances where crowded teeth were decayed and filled on their contiguous sides, by men of considerable skill in packing gold, which teeth were lost in a very few years from the want of judicious filing. I have seen instances where well constituted teeth were lost from the kind of filing they received, when they required both *filing* and *filling*, the filing being such as to greatly disfigure the incisors, from the removal of from one-fourth to one-third of the tooth — decay, by the process, not entirely eradicated; the bone left unpolished, a deep and rough notch cut in the sides of the teeth near the gum, and left in such shape as almost to prevent any dental operator, however skilful, from making a good looking or permanent operation upon them. The use of amalgam in approximal cavities, the amalgam left rough and untrimmed, projecting over the upper margin of the cavities under or near the gums, inducing trouble, constitute another class of teeth needlessly sacrificed to ideas of cheapness, want of skill or a good conscience. Many others might be adduced, such as approximal cavities prepared imperfectly, the edges left frail and rough, the gold wanting in density and fulness — so much so that with ease you can penetrate it with a blunt instrument to the decayed bone beneath, which the operator had not the skill, eyes, hands or conscience to remove.

Permit me to say that this class of operations are of too frequent occurrence, especially when we consider the reputation American dentists have achieved in foreign lands. Indeed, it

is said that most of the French are of the opinion if one is an American dentist, that is enough to ensure his being a good one. We all wish this was literally true. Let us do all we can to make it true. Let us continue to strive for the improvement of ourselves in the art we practise, and to extend the right hand of fellowship to those who, on its threshhold, are ambitious for knowledge and advancement, and who require to be taught and encouraged, till in our country, at least, there shall no longer exist reason to speak or write on the unnecessary sacrifice of the teeth.

REPRODUCTION OF THE ALVEOLAR PROCESSES.

BY

W. H. ATKINSON.

These bodies, like all the tissues and organs composing the living human organism are constantly being destroyed and reproduced in their integral parts.

And he who best understands this process — called *de*structive and *con*structive assimilation — will be best able to comprehend the possibilities and probabilities of the same process when it is expressed in larger territories than is common under the ordinary circumstances of the growth and nutrition of these in normal waste and supply.

The primal necessity of vital activity in any part, is supply of the arteriose and neural bloods, in whose joint communion alone the primates of organs can be formed and sustained.

Wherever, then, the supply is cut off, death, proportionate to the privation, will ensue. When the territory of a single cell alone is thus circumstanced, it is readily removed and replaced by enlargement of the adjacent cells, or the reproduction of a new one to take its place or converted into a mere filament of scar- or connective-tissue by the collapse of its wall and the escape of contents into the neural sea (juices of the flesh), in which it is either converted into pabulum by the digestion peculiar to that place, or it is carried into the general circulation and disposed of as effete matter. And thus the system is happily rid of this dead body whose presence was intolerable to its living neighbors.

Let an indefinite number of contiguous cells be in the circumstance just delineated, and we have incipient abscess. Just so soon as death and disruption of this cell-territory, or rather cells of this territory, take place, a digestion is attempted of this material, which, when it succeeds, becomes the nidus in which new cells proliferate to restore the part, and repair is effected by the first intention, and so our incipient never becomes mature abscess. But, in case of inability of this digestive effort to perform its intent, a lower form of vital activity, called chemical, steps in and digests the matters into sanies, pus, etc., and then true abscess has declared its dominion in that territory, and is present in proper form and pronouncement. When this abscess is evacuated by natural or artificial means, the same process of repair goes on to complete the cure, and is now called reproduction by the second intention of the kindly guardian whose mission it is to care for the parts involved.

Thus it will be readily seen that the two forms of reproduction called first and second intention, are but differing degrees of the identical forces at work in caring for the body as a whole by attending so assiduously to the primates of which it is composed and upon whose integrity and well-being its own health and vigor so absolutely depend!

The only barrier in the way of absolutely successful treatment of these cases by the surgeon, is want of sharpness of vision, corporal and mental to detect them in these stages of pronouncement. The necrosed cells, dead bodies, in the second example of privation of supply are the cause of the necessity for local or surgical interference.

The sanies and the pus corpuscles are incapable of being wrought into healthy pabulum; hence the imperative necessity for their removal. I would never wait for the slow process of nature to open an alveolar abscess, but would boldly plunge into its most interior just so soon as it was cognizable, thus

saving loss of substance and loss of time in the cure, no less than entering an efficient caveat against unlimited extension into the processes and surrounding parts in poorly constituted frames. If the territory over which stasis has been pronounced be vigorously incised, even into the bony processes, the necessity of "reproduction of alveolar processes" will have been annihilated.

But where from neglect, or any cause, the supply has been so long prohibited from entering the territories of soft parts or bones, that death (necrosis) has actually already ensued, we need not despair of success most marvellous and complete, if we are only humble and earnest enough to observe the law and effect the work indicated by kind nature's lead. That is, remove the dead and dying territories, and encourage, by judicious support, the disconsolate, mangled neighborhood from which they were forced, until a fresh colony of cells can be induced to occupy the ground so perfectly, as to defy minutest survey to detect that they were not the very original cells and lineal descendants which primarily occupied that territory.

There are two distinct forms of death of the alveolar processes, both of which are amenable to cure by simple incision, if done at the proper time and stage of development. I refer to solution of the lime and animal basis in which it is lodged; and necrosis, properly so called; both of these conditions result from interruption of the circulation which supplies these thin processes and trabeculæ.

Traumatic lesion may produce *necrosis*, but never immediate *solution* of these bones.

Constitutional vice, resultant upon the introduction of a poison (virus) into the system, can alone so derange the nutrient activity as to induce rapid solution of the alveolar plates *in situ*. Mercury carries the palm in this respect, especially in the free margins of the alveolar process, or edges of the sockets in which the teeth are held; and the thin, hard palatal process of

the superior maxilla forming the fornix or roof of the mouth, anterior to the palatal bones proper.

These last yield very often to syphilitic poisoning, and injudicious or heroic mercurialization. In fact it is common, under such circumstances, to see all the bones of the head and face defaced and dissolved through their whole extent: worm-eaten, gnawed, frail and fetid.

Recovery in such cases can only take place under the best care and treatment, the principal of which consists in abundance of highly nutritious food to support the system, while administering heroic quantities of the iodide of potassium. This remedy has the effect of washing out the virus (and debris of broken down osseous and soft structures), whether syphilitic or mercurial.

Mercury should not be continued after the second stage of syphilization has been partially controlled by it, unless the iodide of potassium also be given at the same time; as, when mercury is relied upon alone, and continued after the secondary symptoms have subsided, it is so very apt to coincide with the disease in preference to antidoting it, as it did in the former condition.

Dentists usually do not see cases until the death of the bones has so far progressed as to call attention to alveolar abscesses resultant upon the necrosed processes. Hence, the oral surgeon will not need to administer mercurials to the majority of cases requiring the assistance he is supposed to be able to give; but he must be able to prescribe the proper supporting and depurative treatment constitutionally, or fail to get the highest benefits of his local manipulations and dressings, be they never so skilfully and scientifically applied.

A rich diet to support the drain upon the blood column, by suppurative discharge and by normal exudation into the pocket out of which the new structures are to be built, is as absolutely

a part of the cure as is the antidoting of the blood poison that wrought the destructive mischief.

Cleanliness of mind and body, sunlight and plenty of fresh air are also prime necessities of a sound cure in complete reproduction of the lost alveolar processes. A few directions about the removal of dead and dying processes and proper dressings, and we close this imperfect paper.

Where separation of dead portions of process has already taken place, a very simple procedure is necessary, viz: Enlarge the fistulous openings already present in such a way as to preserve the best form of pocket in which to hold the amorphous plasm from which we are to derive our new bones and other structures. After which, one simple dressing of a solution of the chloride of zinc, twenty grains to the ounce of water, then wine of opium in full strength, say twice a day for the first few days.

The great thing is to treat just enough and not too much. Many failures to get good processes reproduced where they are gone, are, I am quite sure, attributable to over-doing the cases by the anxious, young oral surgeon.

The sole object of treatment is to change the pus-producing surfaces to plasm-producing agencies, so that we may have good material in the proper place, to be wrought into the new structures we are so anxious to see spring up. Where the line of demarkation between living and dead tissues is not well defined in narrow limits, the question arises, shall we wait for exfoliation and separation of the necrosed parts, or shall we anticipate extensive destruction by at once removing all that part already dead? By peeling off the soft parts with a well-adapted, blunt instrument, like a flat-pointed burnisher, called a spud, and narrow files passed through the processes in two or more places, freeing these dead parts from all attachment; afterwards filing or rasping with suitable instrument, rasp, burr, file or scraper, until the living territories are invaded, which will be known by the peculiar living feel, and the flow of arterial blood oozing

from the fine haversian canals and cancellous structure. We should most unhesitatingly give adherence to the latter procedure; even dry lint or cotton dressings, after having thoroughly cleansed out the debris of file or other instrument with warm water, in which a few drops of tincture arnica are thrown, will, in the majority of cases, secure a nice pocket which will fill in a few days.

But in cases where much pus and sanies still ooze from the chasm from which we have removed, or thought we had removed, all the dead parts, it will be well to look more closely lest some necrosed parts yet remain. If we do not discover, by our best research, that such is the case, then we should dress the whole tortuous, winding chasm or chasms with a saturated solution of iodine in pure creosote, on cotton pledgets that will nicely fit the cavities and represent the size and shape of the pocket we desire to hold the material out of which to reproduce new parts. These dressings should remain in place twenty-four hours and then be nicely and completely removed, and their places occupied with others wet in a weak solution of chloride of zinc; these also to remain in place one whole day. Afterwards, wine of opium on cotton, or dry cotton or lint, should be inserted, and removed twice in twenty-four hours.

Each successive dressing will be less than its predecessor, until the whole cavity is filled up, in all cases that are properly dealt with locally and constitutionally.

Having advised the syringe to be used in cleansing the chasm, after removal of the dead parts, it may be necessary to caution the inexperienced oral surgeon against too much violence in using the syringe. I have seen many cases much prolonged in treatment from this cause alone, by breaking down plasm and granulations and washing them away by the force of the stream. And of course the cure must be retarded by such loss of the very things we need to close up the space with new structure.

Being aware of the ambiguity of verbal instructions alone,

permit me to advise each one who wishes to be up to the best skill, and to make advances rapidly thereon, to call upon those who are already competent to treat these cases, and get the eye and hand educated as well as the ear and brain. The more earnest minds focalize upon any one subject the more rapidly will it advance to its limits of capability for good to the race and the profession.

REPORT OF COMMITTEE ON OPERATIVE DENTISTRY

BY

J. A. KENNICUTT, D. D. S.

READ BY DR. W. H. ALLEN.

Mr. President and Gentlemen of the American Dental Association:

Permit me to remark by way of personal introduction, for although a practitioner for nearly twenty-five years, I feel myself to be a comparative stranger among you, that I am but an humble student of our noble profession; yet as one of the reapers sent out by you into the ripe field of dental science, I have harvested my little sheaf, and now return to you again bearing it home, and hoping that it may be found to contain more wheat than tares, I leave it to your superior wisdom and knowledge to separate and preserve the golden kernels.

I must also remark by way of apology for what may follow that if I have sacrificed aught of rhetoric, or elegance of style, to brevity and practicality, it is not only because I have a keen appreciation of "the soul of wit," but that my hand is far more skilful in the use of my instruments than in wielding the pen; and that I have had more practice in the art of *third dentition*, than in constructing well-rounded periods of Anglo-Saxon.

Passing over the physiological phenomenon of dentition, I will come at once to the pathological conditions which form the subject of

OPERATIVE DENTISTRY.

And first of CARIES, that pathological condition of the teeth, which is the root of nearly all the evils that these organs are

heirs to, and is the direct cause of that terrible affection which the poet Burns so vigorously characterized and denounced in the same breath, as a "*hell of a' disease.*"

In order to determine upon the correct treatment of this disease, it will be necessary to glance at its causes; we know that there are but two agents that can produce it, acids and alkalies, the action of which requires no description at my hands. As "prevention is better than cure," it must be considered good treatment whenever it can be applied; let us therefore give this remedy its due importance and consideration, so far at least as it comes within the scope of dental surgery.

We will take it for granted that every proper dentist, from motives of humanity, as well as duty and honor, will recommend, and strive to enforce upon his patients the proper use of those means within their reach, which come under the head of preventives; but there are some forms of this disease which are beyond the art of medicine or the care of the patient to prevent, but which can readily be met and overcome by timely operations. I refer to the natural defects of the enamel, such as its imperfect fusion or union in the natural depressions of the teeth, atrophy and calcareous decay or imperfect atrophy.

This is a phase of the subject to which I wish to direct especial attention, not only because of its great importance, but that it has heretofore been almost entirely ignored by writers on dental surgery.

It will be found upon a critical examination of the teeth of very young persons, that more or less of them, sometimes all of them, are imperfect in the depressions upon their grinding surfaces, and in the lingual and labial grooves, leaving a fissure of more or less extent down to the bone, exposing it to immediate attacks of decay, which sooner or later must be the inevitable result. So too, with the pits and hollows formed by atrophy which generally reach the bone, and with the same inevitable result.

Shall we then, knowing these facts, supinely fold our arms, and wait for the arch enemy to make the attack, through fear of being accused of "making holes" where none exist, or shall we wisely and fearlessly prepare these cavities, as if they had been formed by the ordinary process of decay, and while it may be done with a simple and painless operation, and fill them; leaving the result to the approval of a clear conscience and the good sense of our patients, who will in the end not fail to see the wisdom of the proceeding? It seems to me that every consideration of duty and honor points to this course; and it is a sufficient answer to those ill-natured persons who would impugn our motives, that the dentist who forms a cavity where there is no defect requiring an operation, will most assuredly earn his miserable fee before he gets it filled.

The remaining, or third condition of this class, which I have described as "calcareous decays," though fortunately of far less frequency, is still far more difficult of explanation and treatment. Its true cause is still somewhat obscure, but it is probably due in the first place, like atrophy, to deficient vitality in the formatory process, which leaves the enamel of the diseased part weakened and imperfect; and in the next place, it is probable that here we must look for the legitimate effects of the second cause of caries — alkaline action. The substance of the tooth that has been broken down in this disease shows a total destruction of the animal matter, while the earthy materials remain apparently untouched. It is never found, so far as my observation goes, except in those mouths which usually have an excess of alkaline secretions, and the class of teeth which it attacks are in other respects of the strongest character, and is universally accompanied by a robust, healthy constitution. It has three phases, but its initial sign is a white opaque spot on the enamel generally of the molars and superior incisors, but it not unfrequently involves the bicuspids and canines also. The white spot referred to, frequently remains for years, and

sometimes even through life, without material change. But generally from the twelfth to the twentieth year it begins to spread, assuming a brown color, and creeping along, apparently just under the enamel, but really involving its whole substance, together with more or less of the subjacent dentine, until not unfrequently, the whole exterior of the crown is involved. In this condition it often remains for some time, giving no further uneasiness than its unsightly appearance, until some change in the secretions alters the character of the disease, and the tooth "melts away as the dew of the morning."

Another phase of this disease attacks the dentine in the grinding surfaces of teeth, whose enamel has been worn off by attrition or chemical abrasion. Its attack and its effects, and indeed its whole characteristics are apparently the same as the first, except that it attacks only the dentine and is not preceded by the opaque spot. *Its exciting cause is undoubtedly the same.* It manifests itself usually as soon as the smallest portion of the dentine is exposed, by a brownish tinge, which deepens in color until it becomes almost black.

The treatment of the first phase of this disease, whatever its real specific name may be, atrophy, necrosis, mortification or dry rot, to be successful, must necessarily be of the preventive class; for when it has once assumed the active form and characteristic brown color, it is nearly impossible to arrest it. At this stage it can only be effectually overcome by the radical process of the entire extirpation and replacement of the diseased part, which in some cases may involve the removal of half or two-thirds of the enamel of the affected tooth. It is imperative that every particle of the friable, chalky substance, whether it is discolored or not, should be removed. The operator is very apt to be deceived here, from the fact that a thin film of the exterior portion of the enamel remains firm, but the disease is still progressing, and will continue to burrow rapidly under this thin transparent film of enamel, though the subsequent operation

of replacement be never so perfect. I have seen many a beautiful and elaborate case of filling in this class of teeth, come to a speedy and total failure from a too timid treatment of the case.

The true remedy, as I have already indicated, is prevention. Watch its initial sign — the opaque spot — and extirpate and fill on the first appearance of change to the active form. This, and nothing else, will meet the case.

The treatment of the third phase of this disease, or that which manifests itself in the abraded grinding surfaces of teeth, must also be of the preventive character; and, to be effectual, must be prompt and radical. In general, every particle of exposed dentine should be removed to the proper depth, to form a good cavity, and replaced with a proper gold filling. It is often necessary to fill entirely across the cutting edges of the incisors, or to cap the entire crown of molars. But, as a rule, if the operation is instituted in proper time, and the filling left a little prominent, it will prevent further wearing of the teeth, and consequently arrest the disease.

The next and last form of caries which admits of preventive treatment, is really only the incipient stage of true caries, and from its location denominated superficial decay. Its treatment consists in carefully removing all of the softened substance of the teeth, whether enamel or dentine, so as to leave a plain, even surface, and then carefully and perfectly polishing the affected part. This may be effected by the use of a proper file to begin with, if it is of considerable depth, or very rough, to be followed next with Scotch stone, and then with pumice on the end of a pine or cedar stick, and finished with rouge, applied like the pumice, with a suitable piece of fine-grained wood. If the decay is located on the approximal surfaces of the teeth, proceed with the file where necessary, and then with strips of fine emery paper, to be followed first with a buffer of chamois leather, charged with pumice, and then with rouge. The strips of emery can be used here to very great advantage, as

they can be managed by the operator so as to cut just where he chooses; and by bending around the tooth, they leave it with its natural rounded surface. The strips of chamois, charged with pumice and rouge, of course operate in the same way, and give the surface a very beautiful and high polish.

There is, however, one object gained in the use of the rouge, besides its polishing properties, which I consider of very great importance. Its finer particles become forced into the open mouths of the tubuli, filling them up with an insoluble substance, which does much to protect the part operated upon from future attacks of decay.

We come now to the consideration of *true caries*, the monarch of oral diseases, who sits like a Nero enthroned amidst the wreck of life and beauty that he has destroyed. This disease, which, together with its resultant ills, may be considered Nature's capital punishment for her outraged laws, requires, also, Art's capital operation for its arrest and cure. It admits of but one mode of treatment — entire extirpation and replacement. Any novice can extract a tooth, and if he bungles, kind Nature draws the mantle of charity over his mistakes; but here the most learned and skilful may approach with fear and trembling, for nature rebels against every effort to repair her lost integrity, and the canty dame must be petted and cajoled and often compromised with in order to secure even partial success. Indeed, this is an operation upon which more reputations are lost and won, than any other, or all others in the whole range of dental surgery. At the very outset we are met by this mysterious "Harp of a thousand strings," and the wailing discord that is rung out by the slightest touch, warns us to beware lest with a rude and careless hand we throw the whole instrument out of tune.

Let me drop the metaphor here and solemnly and earnestly warn the operator, whoever he may be, as he loves mercy and values his reputation for humanity, to shun unnecessary harsh-

ness in this operation. The "heroic mode," to borrow the mild phrase, by which some operators describe their favorite practice, has, in my humble opinion, caused the sacrifice of more teeth than their "heroics" have ever saved, to say nothing of the inconceivable misery that has been suffered by and through it. A lady patient once paid me a backhanded compliment, which contained the severest criticism upon the "most approved style" that I have ever heard. She brought a letter of introduction from a mutual friend who requested me to deal gently with her as she was extremely nervous and had hesitated a long time about coming "for fear of being killed." When the operations were completed and the lady was about taking her leave, she thanked me for the kind and gentle manner in which I had borne with her "weak nerves," but said, "I fear you have not done me a first-rate job, for I came expecting to be half killed, and you have not hurt me at all." Gentlemen, is it not a shame that the very name of our noble profession should cause a shudder by its dreadful import?

In the treatment of this disease we must first consider the pathological conditions of the teeth and their connections, and the constitutional idiosyncrasies of the patient before we can adopt any rational course of therapeutic treatment, or determine whether that treatment shall be topical or general. If a condition of exalted sensibility of all the teeth and general derangement of the nervous system is present, no operation can be performed with a reasonable expectation of success, until the patient undergoes a proper course of treatment. After the general treatment has been prescribed, the patient should be directed to use an anti-acid dentifrice together with soothing and astringent lotions, from three to six times a day. If the exalted sensibility is local, or confined to certain teeth, it may be overcome in several different ways; and right here I must be permitted to observe, that I neither wish nor intend to meddle with theories any farther than they interfere with practical

results. There is one theory, however, in regard to this exalted sensibility of dentine which, if practically applied, would most seriously interfere with our treatment of the disease. It is contended that this exalted sensibility of the dentine does not depend upon the presence of nerve filaments in the substance of the tooth; in fact that there are no nerve filaments to be found in the tubuli of dentine. But fortunately the advocates of this theory practically ignore it themselves. They recommend the use, and in their own practice do use, escharotics to subdue this inflamed condition of the dentine, which, if their theory were correct, would be sheer nonsense. Goddard himself, who first preached against the organization of dentine, *practised* according to the opposite theory.

In my own practice, after having tried with varying success the whole list of narcotic and escharotic remedies, I have adopted the following practice, which I mean to pursue until I find out a better.

If necessary to operate immediately whether the pulp is exposed or not, and after all the decayed matter that can be excavated without pain has been removed, and the cavity has been syringed with warm water and thoroughly dried, apply upon a small pledget of cotton, in proportion to the size of the cavity, a thin solution of morphine and aconitine in creosote, in the proportion of ten grains of morphine to one of aconitine and cover with wax melted in, so as to close the mouth of the cavity. In from forty to sixty minutes, in most cases, it will have subdued the sensibility of the parts in contact with it, sufficiently to admit of excavating the remaining decay. If retaining points or grooves are to be cut into the solid bone, the point of the drill should be dipped into the anodyne and the cutting done quite slowly. Where time will admit, it is better to let the anodyne remain in from two to four hours. Its effect will be more complete and, if properly secured, no harm can result.

There are some cases, however, where neither this nor any

other narcotic will entirely subdue the sensitiveness of the bone and in such an event, if it is still desirable to operate immediately, resort must be had either to escharotics or anæsthetics. I am far more favorably inclined to the latter, though I often, employ the former. In all proper cases chloroform is all that could be desired for the purpose, especially in very young persons. The patient need not and should not be put wholly under its influence; a partial dose is all that is necessary, and is better for the purpose than complete anæsthesia. If the anæsthetic mode is adopted, all the cavities that are intended to be operated upon at one sitting, should be opened and as completely prepared as they may be without giving too much pain, and everything made ready for rapid operating before administering the anæsthetic, so that the patient need not be kept under its influence any longer than is absolutely necessary. But when given, the influence should be kept up until the operation is completed.

If escharotics are employed, the preliminary steps should be the same as in the use of sedatives, and for immediate effect, chloride of zinc is doubtless the best of its class for this purpose. Its chloroformal solution is the most prompt in its action and is the least painful of any form in which I have tried it.

The ethereal solution of terchloride of gold is also very prompt in its action; and the pain which it produces, though much sharper while it lasts, is soon over.

Both of these agents are quite objectionable on account of the pain which always accompany their action, — some patients declaring that the remedy is worse than the disease.

But the agent most employed, and the longest tested of all the escharotic class is arsenious acid, which still deservedly stands at the head of the list of caustics in dental surgery. Its action is comparatively slow, and consequently not available where immediate effect is required, but it is energetic and

thorough, though kind and even conservative in its effect when properly used. It should be used in the form of a saturated AQUEOUS solution, and, to prevent the pain which is very apt to follow its application in this simple form, it should be combined with the narcotic preparation already mentioned. The time necessary for its proper effect for this purpose, varies from one to ten hours, according to the age and condition of the patient. It must be used with extreme caution in the teeth of very young persons, and must, like all other caustics, on no account be applied where the nerve is exposed, or even nearly so, unless the object be to destroy it. There is one essential difference of the utmost practical importance, between the action of arsenious acid, and the chlorides mentioned; the latter are simply *obtundants*, suspending vitality for the time being only, while the former is a devitalizer, destroying vitality as far as its action extends.

The antiseptic power of arsenic is a property of great value to the dental surgeon, the importance of which can scarcely be over-estimated. *It is this quality* which neutralizes the *seeming* recklessness of these operators who practise leaving their arsenical applications in for weeks, and even months. After treating inflamed dentine with arsenic, the cavity may be prepared and filled immediately; but the use of the chlorides should be followed by the anodyne dressing, if it is only for a minute or two, for the purpose of preventing the exalted sensibility which invariably follows their application to sensitive dentine, unaccompanied by a sedative.

I would fain avoid the next step, which follows in the consecutive order of my theme, — the treatment of exposed nerves. I naturally shrink from antagonism with opinions which appear to be as honestly entertained as my own; but as my views upon this point are fixed and radical, I find myself compelled to differ with some of my distinguished brethren.

I said in this Convention a year ago, that had I the power,

there were two instruments (the file and the forceps) that I would banish from the profession. I said so because I honestly believe that their loss to the profession would be a gain to the human family; for if we had not the power to extract teeth, we should without doubt speedily discover the means to save them. And so in regard to the treatment of exposed nerves: I had almost said I wished we were without the means of destroying them, it is so much better and so much easier to save them.

Assuming, then, that the pulp should always be preserved, where it is possible to do so, it only remains to determine the best means of doing it. In all cases of recent exposure, this is simple and easy enough. We must proceed, as in the case of inflammation of the dentine, to treat with sedatives and astringents, until both pulp and dentine are restored to their normal condition, and then prepare the cavity, cap the nerve and fill; and I confidently and boldly make the assertion that there is no more need of failure in this class of cases, than in treating ordinary simple caries.

In long exposure, however, with chronic inflammation of pulp and periosteum, the case is somewhat more serious, but we may still proceed with confident expectations of success, the failures, if any, being justly attributable to constitutional idiosyncrasies, absolutely beyond the control of therapeutic agents.

In the next class of cases, however, where, in addition to chronic and periosteal inflammation, we have superficial ulceration of the pulp, and, perhaps, necrosis of the crown, we may anticipate *some* failures; but, even here, I believe it to be the province of the true dentist to give the nerve, or what is left of it, a fair trial for its life. My own experience is, that a large majority, even of these desperate cases, may be successfully treated and the teeth rendered in a better condition, for all practical purposes, than they would be with the nerves destroyed.

We do not need to be told of the involuntary effort to avoid

using a tooth that has suffered the loss of its pulp, no matter by what process, or of the very much greater liability to ulceration and many other painful diseases, to say nothing of the total loss of natural beauty.

In the treatment of this class, simple sedatives and astringents are not always sufficient. In some instances, we are compelled to resort to caustics, counter irritation, local and general depletion, etc., to change the action of the diseased parts; but, in general, after all irritating causes are removed, very simple therapeutic treatment will suffice to restore the parts to a healthy condition, and then success will depend upon the subsequent surgical treatment of the case.

The next step in the treatment of exposed pulps, capping the nerve, is really the most difficult, delicate and important part of the whole operation; though simple enough indeed, to the skilful manipulator, if he adequately comprehends the essential qualities of the operation.

The cap must consist of two materials of opposite nature, the one rigid and firm enough to support the greatest possible pressure that it may receive in the process of filling the cavity, without yielding, and the other soft and yielding enough to take a perfect impression of the pulp without injurious pressure. Neither material must be corrosive in the slightest degree; nor must there be any incompatibility between these and the nerve. The plastic material, or that which comes next to the nerve, must also be essentially non-conducting and indestructible.

Fortunately, we have just what is required in two articles, which are, or should be found on every operating table, pure gold and pure gutta-percha. The operator should have a quantity of caps prepared from thin gold plate of various forms and sizes, so that he may select one to fit any cavity. They must be swedged up with a punch, in a concave form, and the edges made thin and smooth with the file, or a die might be constructed to cut and shape them, of the required form and size, all at the

same operation. Some will require it to be round, some oval and some pyriform. The gutta percha, which can be procured in the shops in the liquid form, should be evaporated to dryness, then cut into pieces ranging in sizes from a grain of mustard to a No. 10 shot. After selecting a cap which must be large enough to cover the exposed portion of the pulp and rest upon a solid margin of bone beyond it, the operator will place in it a piece of gutta-percha sufficiently large when melted, to fill the concavity and extend somewhat above it. Then hold the cap over a spirit lamp, until the gutta-percha is melted, and with a smooth-faced plugger, the point of which has been warmed and slightly smeared with the melted gutta-percha, touch the convex side of the cap, when it will adhere and afford a very convenient means of conveying it to the required position in the cavity.

Now warm a larger instrument to about one hundred and twenty degrees, and place it against the cap, and press it gently down, until it rests firmly upon the surrounding bone, and until the surplus gutta-percha escapes from beneath it. This surplus material may be remove or, it may be left as protection to the sensitive dentine. It is an essential point that there should be no vacuum beneath the cap, and it is also essential that the gutta-percha should be warmed until it is sufficiently limpid to adapt itself to the delicate, soft parts, as well as the hard, without sensible compression.

In case a portion of the nerve has been destroyed, the walls of the pulp cavity should be countersunk with a proper drill nearly to the exposed surface of the remaining portion, and the balance of the operation proceeded with as already described.

I have already intimated that cases will occasionally arise where it is advisable to destroy and remove the pulp, and I know of no better agent for this purpose than a compound of arsenious acid, morphia, creosote and aconite; but there are some essential points in the time and manner of using them that are not generally understood. In the first place I consider it

very essential that the operation shall be begun in the morning, for then this "harp of a thousand strings" upon which we propose to play the dead march will be found keyed up and toned to resist a shock that in the evening would make it tremble with terrible discord. This is by no means a fanciful figure, for it is a well-known fact that pure arsenious acid may frequently be applied to the exposed pulps in the morning without giving pain, while a like result was probably never known in the evening. Another important point is, that the escharotic employed should always be accompanied by a sedative powerful enough to paralyze nervous sensibility in advance of the destroying agent. This we have in the substance called aconite, which should be used in the manner already described for the treatment of inflammation, but in somewhat greater proportions, varying with the age and physiological condition of the patient. This dressing should be suffered to remain in the tooth from twelve to forty-eight hours, then removed and the cavity thoroughly cleansed of all decay, together with any portion of the pulp that can be extirpated without pain, and then renewed if necessary.

There is another method of destroying nerves quite in vogue with certain operators, notwithstanding it has been mildly condemned by the best portion of the profession. It is as follows: Tell your patient that you are about to perform a very *scientific* and difficult operation for the complete extirpation of the pulp; then take an excavator, but don't stop to sharpen it, especially in the presence of your patient, because it would disturb his delicate nervous organization and cause an involuntary shudder; with this make a number of vigorous strokes to lay bare the pulp; if a portion of it be extirpated in this preliminary operation, so much the better, for this will expose it to view and facilitate the delicate operation which is to follow. Now tell your patient to open his mouth wide and keep perfectly still, for you are going to show him the *ne plus ultra* of science; then take a barbed iron and thurst it into the quivering nerve, and when

you have dragged it forth, laugh like a ghoul over the inexpressible torture that you have caused, and the *scientific* operation will be complete.

The only advantage claimed for this inhuman operation is, the *saving of time*, and, I submit it to the honest, sober view of the profession, whether this is sufficient excuse for so horrible an operation. For my own part I cannot find language to express my abhorrence of the practice. It is pure unadulterated barbarism transplanted into the scientific surgery of the nineteenth century.

In the next step toward the operation of preparing the cavity, and filling the opening there are some points which require careful consideration.

I prefer that the general shape of the cavity for filling with gold should be slightly converging towards the bottom, so that in condensing the plug a wedging force will be obtained. It is obvious that by this means a more perfect union of the gold with the walls of the cavity may be formed than would be possible with the reverse method, and if the grooves and retaining points are properly made, there need be no apprehension of a proper plug falling out. In opening nearly all cavities of the molars and bicuspids, two forms of chisels are necessary to break down the enamel and enlarge the orifice of the cavity; of the first the blade should be about an eighth of an inch long and over a line in width and bent nearly to a right angle with the shaft, the edge being on a line with it; the other should be in all respects similar to this, except that the edge should be placed transversely to the shaft. Their temper should be, of course, very hard, and the edge kept keen and thin. With these the work may be done with great rapidity, and without any danger of plunging the instrument into the pulp, for the shaft will prevent its going beyond a certain depth.

In describing the preparation of approximal cavities, I feel bound to enter a vigorous protest against the enormous and

unnecessary waste of material that is suffered by the usual method. It is here that the shameful *abuse* of the file occurs, which called forth on another occasion my denunciation of that instrument. It would not be considered good practice to amputate an arm in order to cure a broken finger, and yet an equally wasteful and indefensible practice has obtained in the preparation of this class of cavities. The Feejee Islanders, it is true, have a barbarous practice of filing their grinders and incisors into the form of saw teeth; but surely this is not a wise example for scientific dental surgeons to follow. I believe the practice of filing away one-third to one-half of a tooth, in order to "open up" the approximal cavities, to be wholly unnecessary, wasteful and wicked. The method which I have followed many years, and that which I believe to be the true one, is to cut down the enamel directly over these cavities — in the molars and bicuspids making an opening large enough to admit the free application of burrs and excavators to every part of the cavity, but not large enough to weaken the tooth, or alter in any way its natural contour when filled. If the crown fosse on that side of the tooth should be decayed, or appear liable to decay, the opening should be cut back to it, and this so shaped as to anchor the whole filling firmly; or, as often happens with the bicuspids, the tooth should be decayed on both approximal surfaces, with decay or defective enamel in the fosse, let this be enlarged or prepared from side to side, and filled as one cavity. These fillings may be finished in the highest style of art, and without cutting through the enamel at any point, or altering the contour of the teeth in the slightest degree. Indeed, the teeth will be left as serviceable for all practicable purposes as before they were decayed, and far less liable to future attacks of decay than if treated in the usual method. The process of finishing these fillings, is, in all essential respects, similar to that described for the removal of superficial caries.

Precisely the same principle should be carried out in the

treatment of approximal cavities in the front teeth, — that is, by separating the teeth with a wedge when possible, or if cutting must be resorted to, let it be done wholly in the posterior surface, and in such a manner that the portion cut away to obtain an opening to the cavity will be fully restored with the filling.

In considering the question of materials for filling teeth, it is a matter of profound regret that no essential progress has been made for the last ten years in this direction.

It has been a favorite dream of mine ever since I entered the profession, that a substance of a crystalline nature would yet be discovered for filling teeth, the counterpart of tooth bone, which should possess the hardness and durability of gold, with the adaptability of paste; and I have spent much time in experiments and consultation with eminent chemists with this object in view, and although I have as yet met with no satisfactory results, I still have an abiding faith in my dream.

Pure gold then being still our "Eureka," let us briefly examine its properties: It possesses sufficient hardness and indestructibility, but in adaptability and color it is very deficient. It has one property — its adhesiveness, the power of being welded cold, that gives it a very great advantage over any other known substance.

An almost exclusive practice with annealed foil for the last eighteen years has convinced me of its superiority over any other form. Very good work it is true, is done with blocks and cylinders, and some very *handsome* work is done with crystal gold, but annealed gold foil stands far above these in every essential particular, and has up to this period no rival. It can be used wherever any other form of gold is at all admissible, and with much better effect. Its wonderful property of cohesion gives the operator absolute control in the essential points of adaptability, form and solidity. No subsequent chemical action, disintegrating or discoloring the plug is ever possible, and it is

entirely safe to say that any subsequent "crumbling" is clearly the fault of the operator and not the method.

Two or three points in the manner of using adhesive gold, not generally practised, I consider very essential. First, it is necessary that the work be kept dry, — not comparatively, but absolutely so, during the operation, in order to secure the best results. This can be effected in but one way: the gold must be heated as it is used, and introduced into the cavity in that condition, — not merely warm, but hot, in order to prevent any condensation of moisture upon it; and even the instruments with which it is handled should be kept warm by passing them frequently through the flame of a lamp. By this means the plug itself, as well as the pellets, may be kept warm enough to expel the moisture of the breath. The adhesiveness of gold rapidly deteriorates on exposure to the atmosphere, and consequently another point is gained by heating it at the moment it is used.

One word in regard to instruments. It is a mistaken idea that it is necessary to have the face of the plugger covered with long sharp points, or indeed any points at all, in order to increase the cohesion between the particles of gold composing the plug. It is the welding principle, and not mechanical force, that should be relied upon to bind the work together. It is convenient, however, to have the face of the introducing instrument serrated, the more readily to seize hold of the pellets and convey them to the required position in the cavity. But the condensing instrument should be nearly smooth, having only two or three shallow grooves in opposite directions across its face. This used with an oscillating and a rotating motion will very rapidly and perfectly consolidate the gold, and is not so liable to slip as if the face were entirely plain.

It has been said that a tooth which can be filled at all, can be filled with gold; but to make this assertion *true in fact*, it is necessary to have some practicable means of

supporting the frail shells of teeth, which are now, as a class, either consigned to the forceps, or filled with paste. This I think we have in a compound which I have long successfully employed, composed of nearly equal parts by bulk, of gum shellac and iron filings. It is used by applying small portions in a state of fusion to the tooth until it is wholly invested, except the orifice of the cavity. It is advisable where practicable, to embrace at least a portion of the adjacent tooth in the matrix, which should be from a sixteenth to an eighth of an inch in thickness. It must not be applied too rapidly, or in very large portions, lest the heat should cause pain. By this method the merest shell may be filled, as readily and as solid as the strongest teeth.

Mr. President and Gentlemen, I am aware that this paper has already exceeded reasonable limits; I must however remark in conclusion, that if in the foregoing I have dealt harshly with established modes and theories, I have done it not unkindly and I wish it distinctly understood that I combat with errors and not men, hoping that if no other good results, it will at least provoke discussion, and thereby elicit truth.

REPORT OF COMMITTEE ON MECHANICAL DENTISTRY.

BY

J. RICHARDSON, D. D. S.

READ BY DR. G. L. FIELD.

In presenting the following report on mechanical dentistry, it is but proper to state that its preparation has been deferred until the last practicable moment in the expectation that the published proceedings of the last meeting of the Association would appear in time to enable the Committee to ascertain what ground had been covered by the last report. They would thus have been better qualified to fulfil the purposes of their appointment intelligently, and in such manner as not to encumber the records of the Association with useless and unprofitable repetition of discussions previously had upon the subject under consideration. In the absence, therefore, of such information, the Committee are impelled to proceed on the assumption that the subject received, at the hands of the Committee who last reported, an exhaustive consideration of all the material facts relating to this department prior to the date of the last meeting at Chicago.

The Committee are unadvised of any special or important modifications or improvements in the manipulations appertaining to the construction of artificial dentures, mounted on gold or other metallic substance, or in the process denominated con-

tinuous gum-work. The resources and invention of practitioners have, of late, been in a large degree directed to perfecting appliances and modes of procedure having reference to the working of caoutchouc or rubber. So completely, indeed, has the introduction of this substance into the dental laboratory revolutionized mechanical practice that but comparatively little at this time is either said or written of other processes, and we may infer either that very limited improvements have been made in older methods, or that those cultivating them have been more than ordinarily reticent.

In respect to continuous gum-work, there is no method, within the entire range of mechanical practice, upon which, for the past few years, the profession has been so little informed, as regards details of progressive development. That the process is being continually improved and perfected may be inferred from the known reputation of the few devoted to it for successful experiment, enterprise and scientific attainments; but for all practical purposes the peculiar and exclusive modes of imparting such aggregations of knowledge as have been developed are tantamount to a practical ignoring of the masses. Whether such a dispensation of important information is consistent with the just demands of the profession, or consonant with that spirit of liberality and inclusiveness which, by contemplating an entire community of thought and effort, has accomplished so much for us in the past, and which promises so much for the future of our profession, we will not presume to determine.

As rubber work is just now commanding the larger share of the profession's attention, the report will be chiefly occupied with the consideration of such modifications or improvements in the manipulations and appliances which have been more recently introduced, omitting, as irrelevant and unnecessary, the more common and generally comprehended details of the process.

Professor E. Wildman has done the profession valuable ser-

vice in his recent publication, entitled, "Instructions in the Manipulation of Hard Rubber, or Vulcanite, for Dental Purposes." It is unquestionably the most exact, comprehensive and reliable monograph yet written on this process, and may be said, indeed, to be nearly, if not quite, exhaustive of the subject upon which it treats. A cursory examination of such portions of this book as are descriptive of manipulations not ordinarily practised, with some amplifications by the Committee, will, doubtless, embody all concerning this method essential to the purposes of this report.

Model. To ensure a smooth and compact surface to the model, fill the plaster impression immediately after it is taken, or, if the latter has become dry, saturate with water before the plaster is poured for the model. To facilitate the separation of impression and model, preference is given to a solution of soap as a coating to the former, and is to be applied to the naked plaster, since if put upon a varnished or wax surface, the face of the model will be rendered pulverulent and easily marred.

In procuring a model from a wax impression, "fill the cavities made by the teeth with water, then add a little plaster mixed thick; jar the impression: the plaster will settle into the recess, and the water will rise; then add sufficient plaster to make the model of the required thickness."

In parting the model from the wax impression when dry, heat is deprecated; it is recommended to "immerse the whole in water at a temperature just sufficient to make the wax plastic enough to be removed from the teeth without endangering their fracture." We would add that, in favorable cases, as where there are no isolated teeth, the remaining ones mutually supporting each other, the wax will be rendered sufficiently pliant by the heat generated in the plaster by the process of hardening or crystallizing, so that if separated in from ten to twenty-five minutes after pouring the plaster, no fracture will be likely

to occur with careful manipulation, while deformity of the impression will be less liable to happen — a matter of some moment, if a duplicate model should be required.

Model Base-Plate and Model Set. For a base for the model set, the author's predilections are altogether in favor of the *prepared gutta-percha.* It is softened by immersion in moderately hot water, and moulded to the model previously saturated with cold water.

Under this head are some valuable suggestions in regard to the use of ordinary plate teeth in connection with parts of sets of teeth. He says: "In some peculiar cases where rubber teeth cannot be procured to answer the purpose, ordinary plate teeth may be used. They can be prepared so as to make them as firm and secure as rubber teeth, by flowing a film of gold solder upon a narrow strip of gold or platina plate. Then square the ends of the platina pins, clamp the strip with the solder-face coated with borax, in contact with the pins, and heat up to the fusing point of the solder; this will unite the strip to the pins, and form a staple, giving a firm hold in the rubber. Where there is a narrow neck of rubber running out to a single tooth, this strip may be extended down into the rubber to give it additional strength; in such case the metal should be serrated at the edge, or have small holes drilled in it."

Instead of forming a loop or staple as in the case last mentioned, we prefer, in many cases, to solder the strip to the tooth in the same manner as ordinarily practised in backing for gold work, the strip being strengthened by flowing solder at the angle of divergence from the heel of the tooth. The rubber in these cases may be cut away to the angle, leaving nothing but the strip of gold and sub-lining of rubber at the base of the tooth. This method may be resorted to with signal advantage in those cases where, on closure of the jaws, the points of the opposing teeth encroach unduly upon the space to be filled, and extend

nearly to the gum, requiring the tooth of replacement to be thinly formed throughout its entire length.

In arranging blocks or gum teeth, it is recommended by Prof. W., in order to ensure greater stability, to cut grooves in the base and lower part of the proximate surfaces of the teeth with a very thin wheel. These form so many points of attachment for the rubber.

The following passage contains some valuable instructions in reference to a method peculiarly available in the use of rubber. Similar expedients have heretofore been practised in connection with gold plates, but with far less facility and accuracy than can be attained with the use of rubber. "In upper sets, when there are only a few under front teeth remaining, and they are irregular as to position or height, it is advantageous to form an articulation, with rubber, just back of the points of the artificial teeth. This is done after the teeth are arranged upon the model plate, by placing soft wax upon the back of the teeth, and allowing the patient to bring the jaws together sufficiently to form the desired articulation. An impression of the antagonizing surfaces of the under teeth is thereby secured, which must be carefully preserved in the model, and also in finishing the rubber set. This will in many cases prove of great utility, giving a bearing for all of the natural teeth, which could not be obtained otherwise without making the artificial teeth irregular and unsightly. Again, there are many cases when the front teeth are properly articulated, in which we find some one or more of the inferior molars projecting up so far as not to admit of the use of an antagonizing porcelain tooth having sufficient substance to enable it to bear the force of mastication; in such cases, rubber may be substituted with good result. The proper length and form of antagonizing face, may be obtained with wax, on the same principle as mentioned in the preceeding case."

The manner of securing a model or matrix differs but little

from that ordinarily practised. Before the piece is encased in the flask, it is advised to coat the inner surfaces of the latter with a solution of soap, or what is better, liquid silex. This enables the plaster, after vulcanizing, to part freely from the flask, leaving the surfaces of the metal clean. The body of the model should also be saturated with water before placing it in the lower section, to prevent it from abstracting an undue quantity of moisture from the newly-poured plaster, which would render it friable and yielding. This is a point of practical importance, inasmuch as the integrity of the model may be affected adversely under pressure unless well sustained by the surrounding plaster.

The following method of parting the flask is presented as the best to secure a mould or matrix uncontaminated with wax, gutta-percha or other foreign substances. "Place the flask in a vessel of water; introduce beside it a thermometer; gradually raise the heat to 130° F., when prepared gutta-percha is used for a model plate; to 120°, when pure wax is used; or to 110°, when the model is composed of paraffine and wax, — not higher. Allow the flask to remain in the water at this temperature a few minutes, so that this degree of heat may penetrate through its substance; then remove and separate." To remove any adherent wax accidentally overheated, "immerse it in cold water for a few minutes, to chill the surface of the wax; it will then part freely from the surface of the plaster, as it is saturated with water."

The author of the work before us is uncompromising in his demands for absolute cleanliness in the manipulation of rubber. He says: "The importance of removing every particle of wax from the mould is demonstrated by some experiments made by the writer to ascertain the effect of lard oil, yellow wax, white wax and paraffine upon rubber, during vulcanization. Rubber was vulcanized in contact with these substances separately; and in each case the integrity of the rubber was destroyed. The

oil acted more energetically than the other substances, leaving the mass, when cold, semi-fluid." Another writer, not of equal celebrity, perhaps, but whose observations are entitled to respect, in a recent communication to the *Dental Cosmos*, says: "In order to test this matter more fully, I have just completed a set where I packed the rubber while the wax was frying around the teeth, and it came out just as good as any, — good color, hard, but not brittle or spongy, and polished as readily and as well as any set I ever saw."

In experiments where results are professedly adjudged by physical characteristics so palpably manifest to the senses, it seems almost incredible that such diverse opinions and deductions should exist. Our own observations of the immediate effects of the contamination of rubber with wax, do not comport with those of Prof. Wildman. We have generally found vulcanized rubber under such circumstances more horn-like, tougher, and less brittle, with a deeper and richer color, and susceptible of a very high polish. We never, however, purposely incorporate the wax; and, when accidentally and unavoidably retained, we subject the contents of the flask to a moderately high and somewhat protracted heat, before packing, to facilitate absorption of wax, and its diffusion throughout the body of the plaster.

Upon the whole, the author's precautions are well-advised; for however much we may differ as to appearances immediately after vulcanizing, there may exist reasonable apprehensions that such contaminations may work ultimate injury to the rubber, under the action of the secretions of the mouth.

There is very little in the concluding portions of the work devoted to entire dentures not generally practised; and the limits of the report admonish us not to introduce unnecessary or immaterial matter.

In the discussion of partial sets, the following methods of attaching metallic clasps to the rubber base, though not entirely

new, are valuable: "First, bend the clasp to fit the tooth accurately; then make the attachment by which it is to be held to the rubber (this may be done by soldering a thin plate of gold, or platina, to the clasp, in such a position that it will be enclosed in the rubber); then perforate the plate with numerous small holes, which should be countersunk on both sides. This plate entering the base, the rubber filling the holes, forms pins which rivet the clasp securely to the rubber plate."

In the other method the same object is attained by soldering headed pins of gold or platina to that part of the clasp lying in contact with the rubber. A tolerable degree of security may also be given to the clasp by simply drilling somewhat larger holes at opposing points, and counter sinking well on the inside of the clasp.

Under the head of "Refitting Gold Plates by Means of Rubber," the author quotes a method given by us to the profession in 1861. The length of the descriptions necessarily excludes it from this report. A simpler and, we think, equally valuable method of accomplishing the same purpose is the following: Secure an impression of the mouth, and from that a model. Prepare the plate to be lined in the following manner: If an upper set, perforate the palatal portion of the plate with from eight to twelve holes at different points, and also the external borders from heel to heel of the plate, at intervals of from one-eighth to half an inch apart, and near the edges. These holes may be about the size of an ordinary knitting needle, and should be countersunk on the lingual and buccal surfaces of the plate. In lower pieces, the holes should be made along the external and internal borders near the edge. The plate thus prepared, is placed upon the model and adjusted to it as accurately as possible, bending the plate here and there carefully with pliers if necessary. Next close the space between the model and edges of the plate throughout the entire border of the latter with wax, building it up upon the

outer surface of the plate as far as it may be desired to extend a rubber rim. The model, with the plate thus attached, is then placed in the lower section of the flask and surrounded by plaster in the usual way, making the lower border of the wax the line of separation. The exposed surface of plaster around the case is then coated with solution of soap, and the upper section filled with plaster. When parted, the plate and teeth will come away with the section last filled, in which grooves may be formed for the escape of surplus rubber. Ordinarily, a single thickness of sheet rubber placed upon the model will be sufficient to fill the matrix when the sections of the flask are brought together. The subsequent steps in the operation will suggest themselves to the operator. The process of refitting rubber plates is identical with the one described. The holes may be made twice or three times as large, and the plate may be scraped or cut away from the palatal surface, if necessary, when adjusting it to the face of the model. In a number of cases so treated, the articulation of the teeth has been so well preserved that we have rarely had occasion to touch a tooth with the wheel. It is accomplished with great facility.

Where, from accidental or other causes, the integrity of the plate is destroyed, and it is desired to construct an entirely new plate, and at the same time preserve the exact arrangement and articulation of the teeth, the following described method is invaluable: "Roughen the palatal surface of the rubber plate, to cause the plaster to adhere to it; then use it as an impression-cup to take a plaster impression, being careful when it is in the mouth to preserve the articulation. In this impression cast the model; trim; cut keys or conical holes at several points in its outer face. Now, before separating the impression from the model, make a cast of the face of the teeth in two or three perpendicular sections, extending to the base of the model, using a solution of soap or other parting substance on the plaster mould. Remove this mould of the face of the teeth,

which indicates their true position relative to the model; then take the impression from the model. By the aid of heat sufficient to soften the rubber, remove the teeth from it. Next make a model plate with prepared gutta-percha. Now, secure the sections of the mould of the face of the teeth to the model (their place will be indicated by the keys), adjust the teeth in their proper positions in the plaster mould of them, and build up with gutta-percha or wax to the proper form of the model set. This being done, test its accuracy of contour and articulation by placing it in the mouth. Then, using the model, proceed as for making a new set."

It will be observed that the above process contemplates the necessity of the patient's presence, in the first instance, to secure an impression of the mouth; and again for a trial of the teeth, temporarily arranged, in the mouth. In cases of faulty adaptation, this procedure would, of course, be necessary; but where no faultiness in that respect exists, the method, with some modifications, may be practised with the same certainty of results in the absence of the patient throughout. In this regard, the modification we shall propose may, in some instances, become a matter of some moment to both operator and patient. The following method, in the main the same as the one described, was suggested to us some year or more ago, by the following circumstances: A lady patient had worn, for a number of years, a full upper denture of continuous gum-work. The body and teeth had suffered such injury as to necessitate the construction of a new set. The patient, from long use and familiarity with the appearance and arrangement of the teeth, had become greatly attached to them, and expressed an ardent desire that in the rubber set the old one should, in respect to color, configuration, size, arrangement and articulation, be as perfectly reproduced as possible. With more than ordinary painstaking, we succeeded to the entire satisfaction of a patient more than usually fastidious and exacting. In the final process of finish-

ing, the plate, in the hands of an assistant, was caught in the brush, and thrown violently some distance, breaking away all that portion covering the right maxillary tuberosity. The injury was irreparable. To reproduce the set, preserving with entire exactness all its features, I adopted the following expedient: The fractured portion was adjusted and held in place by wax applied to the lingual side of the plate; the palatal surface of the latter was then oiled; the piece enclosed and plaster poured for the model, which, when hard, was trimmed to the edges of the plate. Conical holes were then formed at intervals on the sides of the model and two sections, dividing at the mesial line in front, and securing a mould of the faces of all the teeth, were obtained in the manner described by Prof. W. These being detached from the model, the plate with the teeth was carefully separated from the model. In cases where the plate and model cannot be separated without injury to the latter, the model may be cast in sections, and afterwards bound securely together. The porcelain blocks were now removed from the plate, well cleansed, and re-adjusted to the model with the sectional moulds of the face of the teeth in place. Before doing this, however, the grooves in these sections, made by the rim of the plate, were enlarged somewhat to compensate for waste in the final finishing of the rim of the new plate. The teeth in place, and the sectional pieces bound to the body of the model with fine annealed wire, wax was built in upon the face of the model until the required thickness and form of the model plate was obtained. The whole was then placed in the lower section of a flask, and plaster poured in around it sloping from the top of the sectional pieces to the edge of the flask. The entire surface being oiled, the mould was completed by filling the upper section with plaster. When separated, channels were made in the upper section of the mould in such way as to conduct the excess of rubber out over the cutting edges and masticating surfaces of the teeth, and also from the posterior border

of the plate. The rubber was packed into the portion of the mould containing the teeth. The subsequent steps of the process will be readily comprehended. On trial of the finished plate in the mouth, the articulation was faultless, and the reproduction perfect.

Passing to the consideration of mechanical appliances, we desire to call attention, briefly, to the subject of steam-pressure in vulcanizing. The constant and imminent exposure of dentists to the perils of explosion, becomes a matter of practical concern to all; and if, as is alleged, many of the vulcanizers in common use are insecure from inherent defects of construction, or from faultiness in their modes of indicating the elastic force of steam, it is to be hoped the Association will give the matter that degree of consideration which it imperatively demands. No one will deny that the profession has a clear and equitable right to demand of inventors and manufacturers the highest possible immunity from risk consistent with the nature of the agent employed. Some pertinent reflections on this subject were submitted in a paper read by Dr. A. Lawrence before the Massachusetts Dental Association, January 2, 1865. We quote the following material portion: "To the further consideration of the subject, it becomes important to inquire whether the vulcanizers now most in use are sufficiently strong to resist the force applied. From experiments made at the Franklin Institute, it was found that the tensile strength of wrought copper, one inch square, at a temperature of 302°, is 30,872 lbs., and at 392° only 27,154 lbs. Now, it will be found, by mathematical calculation, that at 320°, the usual vulcanizing point, it is about 30,000 lbs. The published tables, however, give 34,000 lbs. as the tensile strength of wrought copper; but it must be borne in mind that the latter figures are based upon experiments at a much lower temperature than that under consideration. Most vulcanizers are now made of sheet copper one-sixteenth of an inch in thickness, and, agreeable to the

foregoing facts, have a tensile strength of 1,875 lbs.; and one four inches in diameter will not sustain a pressure of more than than 150 lbs. per square inch, at a temperature of 363°. Let us next ascertain what force of steam is exerted upon the boiler within a short range of temperatures. We find by the tables of Haswell, King and others, that at 320° the pressure is 85 lbs.; at 324°, 90 lbs.; at 328°, 95 lbs.; and at 332°, it is 100 lbs. per square inch. These figures I have verified by a steam gauge connected with my own vulcanizer, and which I now use in preference to the thermometer, as I consider it more convenient, safer and less liable to accidents. Practical engineers concur in the opinion that a force of not over one-half the sustaining capacity of the boiler can be safely applied."

The logical deduction from these statistics and statements is plain. If a boiler four inches in diameter, constructed of sheet copper one-sixteenth of an inch thick, will not sustain a pressure of more than 150 lbs. per square inch, and, accepting as true what is affirmed by practical engineers, "that a force of not over one-half the sustaining capacity of the boiler can be *safely* applied," then every operator who, with the use of such an instrument, vulcanizes at a heat of 320° is in hourly jeopardy of life and limb.

Intimately connected with the process of vulcanizing is the question of the reliability of thermometers as *indicators* of heat. Dr. Lawrence, commenting on this subject, says: "Suppose the bulb of the thermometer gets slightly fractured, and, the accident not being discovered, the vulcanizer is put to use, what then? If the damage is slight, the mercury may still be made to rise in the tube at high temperatures, but will not truly indicate the full heat or force within. Some time ago, I had some difficulty in producing a desirable shade in my vulcanite work; it was too dark, as is the case when over-heated, and I came to the conclusion that the gum had deteriorated in quality. Other

samples of gum were tried, and at varying lengths of time, yet with the same result. No defect could be discovered in the thermometer by the naked eye, but a microscope revealed a slight crack in the bulb, and the mystery was solved. But what force of steam was produced during these almost despondent trials? Although my vulcanizer would safely bear a pressure of one hundred pounds per square inch, I concluded to use a steam gauge for the future, and now feel a security in its use positively refreshing."

The unreliability of a thermometer has been confirmed on more than one occasion in our own experience, and similar testimony from various members of the profession is not wanting to establish the insecurity of their use. The steam gauge spoken of by Dr. L., seems most perfectly to fulfil the requirements of dentists, and will doubtless be ultimately adopted to the exclusion of the thermometer.

Though other subjects of interest appropriately belonging to this report might be profitably introduced, we are deterred by its already unanticipated extension.

Before closing, the Committee beg to be indulged in some general reflections which, to their apprehension, have an immediate bearing upon the interests of the department of dental practice to which the report relates.

Mechanical dentistry, so-called, but more properly and technically *prosthetic* dentistry, cannot, in itself be strictly regarded as a *primary* good, but must be estimated in the light of a *dernier resort*, to be accepted and practised only in extremity. By all right-minded practitioners, the integrity and preservation of the natural organs of the mouth are the chief and overshadowing objects of concern; and it may be said with sufficient warrant that the distinctive and crowning triumphs of legitimate dentistry are those revealed to us through the skill of the operator in arresting and repairing the ravages of decay, and in the conservative ministrations of dental medicine, surgery, therapeutics

and hygiene. Whatever agencies or influences, therefore, that intrench upon the prescribed domains of conservative dentistry, tending by their operations to diminish or invalidate the results of educated and conscientious skill, can hardly fail to awaken painful apprehensions in the minds of those in the profession who are jealous of its honor, dignity and usefulness. We would by no means detract in the slightest degree from the consideration which rightfully belongs to mechanical practice, but we are amongst those who believe it should be made strictly subordinate and auxiliary to that higher and nobler purpose which contemplates the redemption of the natural organs.

If all practitioners of dentistry were religiously faithful to the trusts they assume, and the people consulted pre-eminently their own best interests, who doubts but that there would be a panic in the artificial tooth market, or that the hordes of tooth-mongers everywhere swarming the country would soon be driven to more lucrative employments. Indispensable as the resources of this department of our art are in cases really necessitous, who questions but that its present enormous patronage and fearfully increasing applications to the demands of community have been reached chiefly through unwarranted and criminal deference to the cowardice, the ignorance, the parsimony or the follies of mankind. Unscourged scoundrels there are everywhere pandering systematically and successfully to these weaknesses and misfortunes.

Unhappily, few operations for the preservation of the natural teeth are unaccompanied by some degree of pain and distress, in many instances severe and protracted; and any mode of escape from such inflictions is eagerly seized upon by the masses who are but too willing to submit to permanent mutilation and lasting injury *on easy terms*, rather than secure, by necessary and heroic endurance, an abiding good at the hands of conservative skill. More unfortunately still, this fear and intolerance are for-

tified by the stupendous folly of supposing that there is full compensation in the resources of our art for the loss of the natural teeth, and, alas! that it is less expensive.

If our statements are verified by facts, who but will admit that those agencies which invite to a useless sacrifice of the natural teeth by rendering their extraction less painful, or that tempt to their loss by considerations of economy, are, in their aggregate influence, unmitigated evils? In this sense, low-priced artificial work and anæsthetics are the opprobrium of dentistry. The former is exemplified most fully in hard-rubber work, the latter in nitrous oxide gas. Either of these, employed with humane regard for the highest interests of the patient, would become an unmixed good; but when we reflect that the ranks of the profession are largely filled up with men unfitted by nature and education for their calling, many of them unscrupulous and mercenary to the last degree, a reasonable doubt is raised in the mind whether these agencies, in their aggregate influences upon the well-being of mankind in respect to dental operations, will not, in the end, prove a curse rather than a blessing. It happens, unfortunately, that the very qualities which commend them to the conscientious and humane, supply occasion for irreparable mischief at the hands of ignorant or unprincipled men.

Thus, rubber-work, by almost common consent, answers well the purposes to which it is applied. The process has become well-grounded in the confidence and good opinion of the people. The moderate cost of materials, and the comparative ease and facility with which it may be constructed, enable the operator to furnish it, with reasonable profits, at rates which bring it within reach not only of the middle classes, but of the comparatively indigent, and thus, in a humanitarian point of view, it must be admitted, an unquestioned blessing to the really necessitous. On the other hand, the very goodness and cheapness of the process invites to a neglect and sacrifice of the natural teeth,

while the comparatively inferior qualifications necessary to construct it afford almost unlimited opportunities for the abuse of patients at the hands of every adventurer who chooses to profit by the weaknesses or the necessities of mankind.

Again, the advent of anæsthetics has been hailed everywhere by suffering humanity with acclamations of thanksgiving. In capital operations, involving severe and protracted suffering, they have had the cordial sanction of the medical profession. In the minor surgical operations appertaining to dental practice, the well-grounded scruples of the more intelligent practitioners in regard to the expèdiency and safety of anæsthetics had well-nigh banished them from practice. That by congelation fell still-born; electricity did not long survive it; ether, though adjudged comparatively safe, has, for various reasons, been little used; a wholesome dread of chloroform had well-nigh sealed its death-warrant. Once more the spirit of Lethe was invoked, and from out its mysterious depths, to which it had been long consigned, sprang the rehabilitated form of nitrous oxide gas. Bearing the benignant impress of the Angel of Mercy on its front, it will be well if it does not in time take on the stern and sinister-visaged aspect of that familiar quadruped traditionally supposed to be going about the earth "seeking whom it may devour."

If the timid and the ill-informed were in danger at the hands of charlatans heretofore, what may be predicted of their perils now, when, freed from all apprehensions of suffering, they may be swindled out of their teeth, not only in a condition of insensibility to pain, but in a state as calm and free from danger as the unconscious repose of a slumbering infant. This learned body, with all the appliances of modern skill, cannot save in a twelvemonth as many priceless organs as are being cruelly sacrificed every day by incompetence the country over, with the use of this agent. As we could imagine no greater blessing than nitrous oxide gas administered at the suggestions of enlightened

skill, so we could conceive of no greater calamities than those which are sure to follow its unauthorized use.

Under the growing evils of charlatanism which afflict the profession, and which detract greatly in public estimation from the regard and consideration which is justly due it, good and true men, who are honestly and earnestly consecrating their best abilities to make it respected and honored, are naturally pained, perplexed, discouraged or disgusted.

There seems but one feasible mode of escape from the perils which encompass us, and that is, to confront quacks with the irresistable logic of legal enactment, and the Legislature of every State in the Union should be respectfully, but persistently, importuned for such action as will put the whole army of pretenders and mountebanks *hors de combat.*

THE INTERGLOBULAR SPACES IN DENTINE.

BY

J. H. McQUILLEN, M.D., D.D.S.

Mr. President and Gentlemen:

Your attention is desired during a brief period, for the purpose of bringing under your notice a subject which is not only interesting when viewed from a scientific stand-point, but also of decided importance on account of its practical bearings; I allude to the interglobular spaces in dentine. Although long familiar with their existence in that tissue through the researches of Owen, Tomes, Czermak, and Kölliker, it is only within the past few months that I can claim to have given to them that careful consideration which they so justly merit. Some investigations which I have recently prosecuted in this direction were prompted by a desire to become more familiar with the subject, and as the microscopical examinations instituted by me and the conclusions arrived at are fresh in my memory, it is possible that their presentation may be of service to those who have paid no attention to the subject, and particularly to some before me who are laboring under erroneous impressions with respect to the exact character and position of these spaces.

To the best of my knowledge, no American observer has as yet placed on record any evidence of a careful examination of these spaces. In an oral address, which I had the honor to deliver last fall, in New London, by invitation of the Connecticut State Dental Association, on the "Microscopy of the Dental

Tissues," the attention of those present was directed in a very brief manner to the interglobular spaces; subsequently, when publishing that address in the Dental Cosmos, an illustration from the American edition of "Kölliker's Microscopical Anatomy" was used, with the view of making the general appearance and position of these spaces more easy of comprehension on the part of readers. That engraving has been very decidedly objected to, by one who claims to have some knowledge of histology and in the use of the microscope, as erroneous, and with the assertion that the appearances there presented are either due to the presence of air bubbles formed in mounting the section in Canada Balsam, or to a mistake on the part of the engraver. My response to this is, that I would not think of charging the merest tyro in the use of the microscope with being so easily beguiled, let alone such a careful and accurate observer as Kölliker, and that any important errors on the part of the engraver would have been noticed by that author and promptly corrected by him while the work was passing through the press.

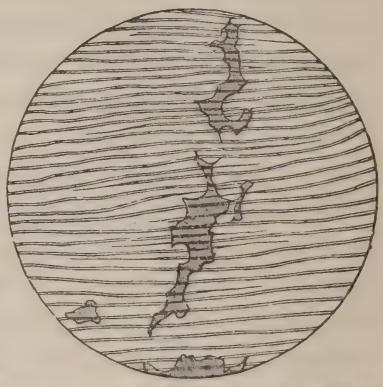
Up to the time when these objections were brought to my notice, notwithstanding the fact of having prepared a large number of sections of teeth and bone, and examined a number prepared by others under the microscope, I had not been fortunate enough to have seen a specimen in which these interglobular spaces were present: determining, however, to thoroughly investigate the subject, I made a number of sections of teeth which had been recently extracted, and in one from a first permanent inferior molar, was fortunate enough to find the object of my search. The evidence of this is before you in one of two large and excellent diagrams, by my friend, Mr. Petit, an artist of Philadelphia; the first of these presents a faithful portraiture of a portion of dentine with the *interglobular spaces*, the other showing the appearance of a section of bone with the *lacunæ* and *canaliculi* observable in that tissue; as I have with me the sections from which these drawings were made, along with a

number of others of the teeth of man and animals, it would afford me much pleasure to show the preparations to those who may desire a view of them under the microscope.

With these preliminary remarks, as it is foreign to my purpose to enter into a detailed consideration of the dental tissues at this time, it will suffice to state in a general way, that human dentine is composed of an immense number of microscopical tubes, the dentinal tubuli, and a matrix, or intertubular tissue, which presents a homogeneous appearance under a lower power, but when highly magnified is found to be made up of minute granules united closely together. The tubuli, commencing by open mouths on the walls of the pulp cavity, may be seen passing in a radiated and a slightly wavy manner toward the periphery of the dentine, where they terminate in the intergrangular spaces of Tomes, or pass on into the enamel or cementum. In their course, they divide dichotomously and give off small branches from their sides which inosculate with each other. Any one who has the slightest familiarity with the microscope is well aware that the calibre of the tubes decreases in size, when passing from the openings on the walls of the pulp cavity to their terminations at the periphery of the dentine; this is due to the fact that as calcification of the structure progresses from without inward, the portion first formed necessarily contains the largest proportion of inorganic matter, owing to a law in the economy that tissues increase in density with age; this is markedly illustrated in the entire obliteration of the dentinal tubuli by calcareous depositions within their parietes as frequently presented in the teeth of old persons. In the coronal dentine, a number of faint lines are often found passing in an arched manner from one side of the section to the other, and at right angles with the dentinal tubuli; these are named, after their discoverer, the contour lines or markings of Owen. They are not confined exclusively to the crown, but may be frequently observed in the roots.

In teeth perfectly formed, the appearances thus hastily described as characteristic of human dentine are invariably presented. In addition to this, the peculiar spaces already referred to as interglobular spaces, are sometimes observable in the neighborhood of the enamel, as in the section from which this drawing was made, (see Fig. 1); but they are by no means invariably confined to that locality, for in some specimens they are scattered in great profusion throughout the coronal dentine, and in other instances they are found in the roots, particularly of deciduous teeth. These spaces do not present a globular or spherical shape, but on the contrary are very irregular in their form, and, although sometimes quite small, are more frequently long and wide, and include a number of tubuli; the name applied to them therefore would seem to be a misnomer; on examining the boundaries of the spaces, however, it will be observed that they have a notched appearance, and are made up apparently of a number of sections of globules; the propriety of the appellation thus becomes quite evident. The tubuli do not generally stop at the boundaries of the interglobular spaces or turn so as to pass along their sides, but they can be readily seen passing directly across them. I direct attention in particular to this fact, as it has been positively asserted that the tubuli never pass through these spaces. They are not so well defined there, it is true, as in perfect dentine, but this is easily accounted for when the exact character of these spaces is fully understood.

Fig. 1.



*Section of Dentine with interglobular spaces.**

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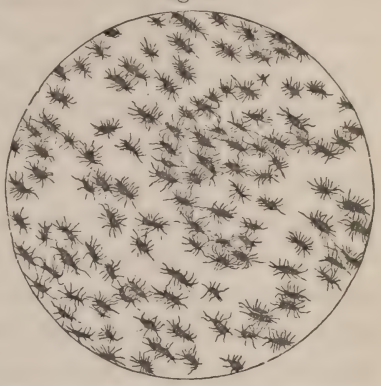
*The illustrations accompanying this communication are from the specimens prepared by me.

With a view to this, we will push our inquiries in that direction. In the first place, it has been inferred by some persons that the interglobular spaces are cavities like the *lacunæ* of bone, but the fallacy of this view becomes readily apparent on examining this drawing of a section of bone (see Fig. 2) and comparing it with the other. In it will be observed a large number of dark lenticular shaped spaces, with several irregular lines passing from each of them, scattered in great profusion over the entire field, and bearing no resemblance to the interglobular spaces, but, on the contrary, not unlike spiders in their shape; Purkinje, who first observed these, regarded them as bodies, and he therefore named them corpuscles, and for a long time they were called the corpuscles of Purkinje. It was eventually found, however, that they are cavities occupied by the *liquor sanguinis* of the blood in life,* and that the apparent lines passing off from them are *canaliculi* or canals which inosculate with each other, and serve to carry the nutrient fluid to every part of the tissue. In microscopical specimens of bone the lacunæ and canaliculi are either occupied by air or Canada balsam, which, by transmitted light, gives to them a black, solid appearance, and it was this that led Purkinje astray. Now, in place of the interglobular spaces being cavities filled with liquor sanguinis during life, they are occupied by a cartilaginous structure analogous to the organic basis in which dentine

Fig. 2.



Section of bone with *lacunæ* and *canaliculæ*.

* Dr. Lionel S. Beale, in his work on "The Structure and Growth of the Tissues," says, that the *lacunæ* are occupied during life by a soft substance which he calls germinal matter.

is formed, but which unlike that, owing to some defect in the assimilative process, has failed to undergo calcification. The tubes running through them are not so well defined as in dentine, owing to the absence of the calcareous matter which in the latter brings out the parietes of the dentinal tubuli in a sharp well defined manner. The presence of these tubes, however, in the interglobular spaces, in the section from a first permanent molar recently extracted, can be made readily apparent to those who will take the trouble to prepare and carefully examine such a specimen. The cartilaginous structure occupying these spaces, however, eventually dries up, and, a section taken from a tooth some time after removal from the mouth, would have actual cavities in it, which, when viewed under the microscope by transmitted light, would present a black appearance like the lacunæ of bone and cementum. This without doubt was the case in the specimens examined by that accurate and indefatigable observer, Mr. Tomes, whose investigations with the microscope have done more than those of any one else to establish clear and accurate views of the minute structure of the human teeth, and whose observations have been so highly and justly prized by the scientific world that they are quoted as reliable authority in the works of most eminent anatomists and physiologists of the present day. The illustrations of the specimens referred to, are to be found in his Dental Physiology and Surgery, published several years ago, in which he directs attention to peculiar-shaped cavities, which he observed as quite numerous in carious teeth lost early in life, particularlythe first permanent molars. As he makes no reference in that work to the appearance of the interglobular spaces, with the cartilaginous substance present in them, it is probable that they escaped his notice up to that time, from the fact of having made his sections from teeth some time after they had been extracted, in place of those recently removed, and in which the cartilaginous substance had dried up, and left actual cavities, as he correctly regarded them.

In conclusion, as evidence of the practical bearings of these investigations, it may be well to direct attention to the fact that the existence of these spaces in teeth which have completed their growth must be regarded as an abnormal condition, predisposing such teeth to decay, and that when either by mechanical action, as by a fall or blow, or by the penetration of external caries, such spaces are reached, the disease here would run riot, hence the importance of care on the part of patient and operator to have the most minute external cavities filled, for though reached only through a microscopical opening, the result would be the same; while, if protected from the action of external influences, or the exciting causes of decay, this predisposition might remain dormant for a lifetime, as is sometimes the case with disease in other organs of the body.

These spaces however, cannot be looked upon always as abnormal; as for instance when existing in young and growing teeth, the arrest of calcification may be remedied subsequently by the assimilative process, as the soft bones of children eventually become strong and hard by the deposition of a due proportion of inorganic matter. It is reasonable to infer that the obliteration of the interglobular spaces in growing teeth assists in giving to dentine, the peculiar markings named contour lines of Owen. The spaces becoming occupied by calcareous matter, their boundaries form the contour lines, and remain as permanent evidence of the former existence of the spaces. In addition to this the primary curvatures of the dentinal tubuli contribute toward that appearance.

In conclusion, it may not be amiss to suggest to those who are disposed to criticise the efforts of others, to be sure they are right themselves, and perfectly familiar with the subject, before they attempt to do so, at least in public.

REPORT OF COMMITTEE ON DENTAL EDUCATION.

BY

DR. G. A. MILLS.

Mr. President, and Gentlemen of the American Dental Association:

It is with feelings of unqualified pleasure that I am privileged even under the flattering circumstances which surround us on this proud occasion, to occupy a few moments of the time, in presenting to you the thoughts I have gathered together. And in your criticisms, remember that though the effort may seem to you to be a feeble one, rest assured I am sincere. My heart, poor and unworthy though it may be, beats high with a holy enthusiasm as my mind reverts back to the days of my boyhood; and I am reminded of my first entrance into this Representative Chamber, resting under the proud dome of the capitol building of my own native State. I well remember the day of my eighteenth year, as I wended my way to this city from a distant town, brought hither by the hard-earned eleven dollars accumulated in the mornings and evenings, aside from the winter school hours of a district school, by sawing wood. I seem to see myself as yet standing at the gallery door on my right, looking with wonder upon the Representative body in session, at that time. Ah, how little did I think that at this early day I should be permitted to be numbered among this body, composed (as I believe) of as noble hearts and as holy desires as any body of men who have ever convened within its walls. For, gentlemen, let me ask, from the innermost recesses of my heart,

is there a more noble, a more holy calling, than that of the dental profession, guided by the light of Christianity? We may well congratulate ourselves that we are circumstanced so favorably in the selection of this spot, sacred with so many blessed memories, a spot which stands out as prominent (if not more so) as any other from which the kindly hand has always been extended to those seeking a liberal Christian education.

And here let me ask this question, Why is it that the word Christian is so often severed from education? A still, small voice whispers in my heart, that it, so mutilated, is shorn of its strength. Why is it, but for this, that so many giant intellects have failed to reach the goal for which they have so eagerly struggled? Gentlemen, in our seekings for a dental education, must we seek so long and gather so little? Can there be a man among us to-day, that would disregard that truthful saying, "If any man lack wisdom, let him ask of God, who giveth liberally and upbraideth not!" Let us break forth from those barricaded battlements of selfish ambition, open wide the windows of our intellect, and close the avenues of our souls against those enchanting wooers of avarice, which have allured so many from the path of duty. A glorious future is open to that man who will walk in the light. The prattling infant of dentistry has long struggled with its mother, Medicine, and sought to be delivered until now. Although dwarfed in its stature by the long withholding from the vivacious influences of progression, mark well the rapidity of its growth. To us, this precocious infant is given to care for and to see well to its future training. We must not let it, in our enthusiasm, put on undue proportions, nor allow the fossilized influences which are so prevalent, to retard its growth. It becomes us in receiving this charge, to weigh well the responsibilities which are laid upon us, to be earnest in the cultivation of our own deportment; for surely as we sow, so shall we reap. In this education, we are not only cultivating our own minds, but the light

which is brought forth by our researches, is to exert its influence through all time.

Now what are we to understand by education in its fullest sense? I take from Appleton's American Cyclopædia, Vol. 6, page 762, this: "Education is derived from the Latin word (*Educo*, to draw out) it is the development of the faculties, or forms of power in man, and the training of them into harmonious action in obedience to the laws of reason and morality, (further) in a more general sense it embraces the universal means by which providence is guiding the human race to its final destiny. According to Plato, "a good education consists in giving to the body and soul all the perfection of which they are susceptible." A writer of the thirteenth century defines the proper education of woman to be, "to know how to pray to God, to love man, to knit and to sew." Another says, "that the early education of the child is of the greatest importance, and in the long procession of things to be learned, nothing appears till the student is prepared to grasp it without difficulty, and the attainments in knowledge come almost unconsciously by a series of easy steps. The child too should be educated not for any trade or profession, but for the common and absolute state of man, subjecting himself not to any thraldom of habit shielded from the corruption of society, and left open to the influences of nature and of conscience."

These remarks may seem to some to be foreign to the end and aim of this Association. Dentistry is but in its childhood, and it is absolutely necessary to instil proper and truthful doctrines to accomplish right results. Confidence is what is much needed by us all. First in each other, — in this we are gaining by our associations. Confidence in ourselves, — in this we advance as we gather knowledge. Last, but not least, confidence in Nature's God; conviction will lead us to this if we lay aside self. Alas! how many are there at this hour struggling to ascend the hill of fame, who are like the frog leaping

from the well; they believe they may reach the top. No! to the science of any man that has no God in it. It floats about for a time, winning some admirers, but is like the gaudy soap bubble from the youngster's pipe, which enchains the fancy, but soon bursts, and all is as before. Much should be said and done to encourage, yes, to insist that those who are contemplating entering our profession, should have a fuller understanding and appreciation of what they propose to undertake. And we should every man of us be so correct in our life, that we may bring to bear an influence for good. By attention to these points, opposition will be banished from every pure-minded person as regards the office of an assistant in our operations. Who are the men that are fitted to educate our brothers, sons, and friends? Those only who are seeking continually to educate themselves, not only in the didactic course and by honest training, but in the heart; that man who does not look within himself, nor above for knowledge, to that fountain of all knowledge, will — yes, — does fail to reach the end sought. Would that we might learn submission, and follow the divine plan that is marked out for every one of us; but as yet humility is not the crowning virtue of our profession.

I trust — yes, I believe — that in the convening of ourselves on this occasion we are to make an advance on a broader and more liberal platform of instruction, and that our enthusiasm shall be so increased, that when we shall return to our labors, and grasp anew the duties laid upon us, all our leisure moments will find us reading, experimenting, and thinking upon the works that are given us to do; then we shall find no time for low, foul-mouthed personalities against our professional brother. This association, I believe, has nobler ends in view. We have have learned by our short experience that progression is to be our motto, and as we look around us to-day and behold the increase of our numbers, we are strengthened. There will go out from this body an influence that will be felt in the com-

munities in which we labor, and not a man who has a love for his profession but will return to his calling with new hopes and desires. Our meetings are to be no longer an experiment; we are to stand out boldly as one of the respected institutions of our glorious country. The little leaven which was gathered but a few short years since, has shown itself powerful in its influence, and all that is visible will be gathered in. Dentistry will in the future win to its ranks men of more culture than in the past. We are setting the standard higher year by year. I do not think we have advanced so rapidly because we are so great, but that we have been so earnest.

The platform of dental education is of necessity so broad, embracing as it does a full understanding of all science, that it seeks access to all the avenues of learning; the recognition of this fact will bring to our doors the bright intellects, and those whose desire it is to delve in the hidden mysteries of nature. Let us instil into all our minds this fact, that the process of education is to be pursued through our lifetime. Let us look with pity on that one who has ceased to learn. It is said (and truly, too, I think,) that we are creatures of habit; then let us seek the habit of study. It is not because so many of our profession are not reading men, that so many can be pointed out who do not read even our own journals. It is not a hard matter to discover who these are by a few moments' conversation with them. It is said (and I admit the truth of it), our dental literature is far from being what it should be. But, will the ones who do not read be the ones to elevate the standard? Such men are not capable of judging what it should be; but let them put aside their egotism caused by ignorance, and to the rescue. How many fail to recognize that, in the education of the mind, the fingers are also made expert. Some one has said, "the fingers execute only what the mind first conceives."

There are men in our profession who would be great, were

their hearts softened by a little Christian education, but to-day put themselves against the tide of progression in the direction we are pursuing, because they do not seem to see the necessity of filling the mind with so much which is, in their opinion, foreign to the end desired. Instances of decided proof are on record to-day, that the glory of such is rapidly departing. Also, there are those who have been so completely encircled by the powerful current of magnetism, that they are aroused only, I fear, like the Cadavera, under like influences, to fall back into the soothing arms of death. But yet their voices are heard in secret conclave, in clarion notes proclaiming "the fulness of time has come, the fulness of time has come!" They feel that they are strong and mighty. But ah! they are unlike the marshalled forces of Gideon, though they may be with trumpet and pitcher in hand. Victory is not theirs, for the Lord is not with them. They have failed to call upon him. To such we can only say, "Come with us and we will do thee good, for the Lord has spoken good concerning Israel."

DENTAL EDUCATION.

BY

J. S. LATIMER, D. D. S.

Education, in general terms, may be said to embrace all the knowledge and skill the individual may acquire during his existence, whether obtained from books, private instruction, schools, intercourse with other people, personal experience, or all of these combined. It may be good, bad or indifferent; or, as they say of the verbs, regular, irregular or defective, depending on the early direction and the subsequent bias. Thus, a man may perform operations in exact imitation of his preceptor, who stuffed his cavities with ropes just twenty years ago; and he may persist in decrying what he styles new-fangled notions and methods. It behooves us, in view of the fact that it is often extremely difficult to unlearn what we have learned amiss, to see to it that we *start* right. For this reason, the teachers in our dental schools should be men who have not hedged themselves about with self-conceit, and said in their hearts, "I have attained all that is worth attaining," but who are ever open to conviction, — ever ready to learn and to put to practice the methods which appeal to their reason. None but growing men are fit for such a position. It should be ever understood, too, that the text-books can never keep pace with the progress of such a rapid growth as our profession now exhibits. I should be sorry to see Harris' Principles and Practice, excellent as it was in its time, held as authority in operative dentistry for the

students of to-day. Books are essential; but there are several directions in which they cannot be held as indisputable authority.

To have a healthy growth we must not only be familiar with the text-books, but we must avail ourselves of the very great advantages offered by colleges, associations, and the current literature of our profession.

Now, for a moment, let us inquire the true objects of a proper dental education. When men essay to become the saviors of the flesh and blood of their fellow-men, are they not undertaking a most important mission? Is not the comfort, — nay, the very life of our fellow-creature, — dependent, to a greater or less degree, upon the skilful and faithful performance of our trust? Is it not our unmistakable duty to God, to our fellows and ourselves, to qualify ourselves to the utmost of our ability, and to encourage and assist others to do the same? Thus we utilize our lives.

Years ago the means of obtaining a dental education were very limited. There were no schools, no journals, no societies, and but few text-books; but there was, instead, a desire on the part of almost every practitioner to keep his methods and appliances to himself. Only one other avenue to knowledge was open and that was through what was misnamed private pupilage, in which, for a generous consideration, the would-be dentist took his chances at picking up, in a few weeks, sufficient accidental crumbs to enable him to *begin* to practise. And, so far as private tuition is concerned, I fear a great majority of the so-called preceptors of *this* day do little better. But we now have several very good schools, with promise of more; a goodly number of local, state and national societies, several journals, and a growing consciousness of our duties as preceptors. So there is hope. Bear with me a few moments while I give you my notions concerning the duties of private preceptors.

First, the teacher should feel himself competent and should be sure that his motives are higher than those of a mere money-getter. As I have already said, it is extremely important that the twig should be bent right; hence the teacher should not only *think* himself competent, but he should *be* so. Not everybody or anybody, indiscriminately, should be taken as students; but only such as are morally, mentally, physically and habitually qualified. The conditions should be, for instance, the depositing by the pupil of say one hundred dollars with the preceptor or with a third party; the money to be invested in Government securities; the pupil to remain with his preceptor for two consecutive years, or for three years, if his collegiate course is to be taken before the expiration of private instruction; the pupil to attend two full courses of lectures at some reputable dental school. The preceptor, on his part, should agree to take great pains to teach the theory and practice of his profession; and should, on the fulfilment of the contract on the part of the pupil, pay back the one hundred dollars and the accrued interest to the pupil for the cancellation of the cost of tickets for the collegiate course. If our profession would to-day resolve, and in all the future do as I have here advised, twenty years would show a noble record.

Everybody bewails the fact that much of the dental practice is empirical. Some gentlemen have gone so far as to call those who so practise *gutter dentists*, and other hard names. While it is true that many men are doing immense mischief by malpractice, it is *not* true that the amount of mischief may be lessened by abusing them. That experiment has been faithfully tried. We must take a more philosophical view, and resort to sounder measures. Every possible encouragement must be extended to induce all to avail themselves of every means of increasing their knowledge and efficiency.

The appeal should be made first and foremost to the sense of right and justice. No man has the right to mutilate his

fellow to his injury — to trifle with the trust reposed in him. Shame, too, should be brought to bear. It is a burning shame and crime to trifle with the health and comfort of our fellow creatures. The pecuniary stimulus, though but mercenary, is still powerful, and we can point to the fact that the public are becoming better able to appreciate dental operations, and are quite willing to render a just compensation for the best services we can perform.

Ambition arising from a laudable desire to excel in any useful vocation, may well be called a laudable ambition; and this stimulus should be applied in every possible way. Who wants to die unhonored and unsung?

The Central States Dental Association has done something to stimulate young men to attend a regular course of instruction, by adopting the following clause in their constitution: "If the candidate (for membership) commences practice after this date, he must invariably be a graduate." The Pennsylvania Dental College stimulates the old practitioners to graduate by offering to all who have been in reputable practice since 1852, the privilege of examination for a degree, without attendance upon a course of lectures. Whether the other schools have similar rules I do not know, but trust they have.

Another sort of stimulus is proposed by our Ohio brethren. They have drawn up a bill entitled "A Bill to Regulate the Practice of Dentistry in the State of Ohio," and its first clause is as follows:

"SECTION I. Be it enacted by the General Assembly of the State of Ohio, That after the first day of September, 1866, it shall be unlawful for any person to practice dentistry in the State of Ohio, unless such person has received a diploma from the faculty of a dental college duly incorporated under the laws of this or any other State of the United States, or a certificate of qualification from the board of examiners, or any citizen of this State who has been in reputable practice of dentistry for the term of ten years."

To the noble men of the "Buckeye State" I would heartily say, God speed you in your enterprise.

Taking the idea from a report of the Odontographic Society published in the Cosmos some months ago, I concluded that as I was not chartered by the State to grant degrees I would in my reports follow the example of Dr. Stellwagen and omit the "Dr." from the names of gentlemen who had not taken the degree of M.D., or D.D.S. It is so palpably absurd for men to *assume* a title which, in itself, presupposes a certificate of qualification granted by a legally authorized body after due examination, that but one gentleman has plainly dissented from my course, and he the very one who should not. I am certain no right-minded man among us has any desire to make the title a meaningless term by countenancing the practice of recognizing *self-assumed titles*, nor would he wish to be called what he is not. To reform our profession in this particular is plainly necessary for its advancement, and it is the duty of every man among us to do his part. By making the title a distinctive mark of the graduate, we shall have added another stimulus to study. I claim that it is the duty of all dentists to be graduates, but I would not occupy your time by giving my reasons therefor, had not I heard the opposite opinion advanced in a private way.

The degree of Doctor of Dental Surgery signifies that the bearer thereof has been examined by a duly authorized board, and has been found competent to practise dentistry. Who can doubt the benefit that would ensue from the application of this test to the great mass of American dentists? If we were sure that it would be applied thoroughly, and without fear or favor, in just six months from to-day, there would be a hurrying to and fro; dusty tomes would be taken from dusty shelves; there would be a "run" on the book-stores; and the publishers of our various journals would find their subscription lists becoming suddenly and wonderfully enlarged. Besides this, the various schools would be full and running over, and the deans would have

to employ private secretaries to attend to their correspondence. Gentlemen would not only covet the necessary knowledge and skill, but they would require no urging to accept the certificate of its possession.

That the young student should avail himself of every means of increasing his usefulness is self-evident, and that schools, properly conducted by competent teachers, are a most excellent means of education, none will deny. If any should have the hardihood to assert that a diploma can be purchased from any or each of the schools without the applicant's submitting to a faithful examination and being really qualified, I can only say, the fault, if your accusation is true, is not with the system, but with the men. Change the *men*, if you will, but do not continue your accusation against the plan. Every argument that you can bring to bear against *dental* schools will apply to all other schools; yet what sane man would object to academical instruction because some such men as Benjamin Franklin, Abraham Lincoln and many others, have attained to usefulness and eminence without it, or because very many graduates prove to be men of no usefulness whatever?

But there is an additional reason why the old practitioner should take a degree. He may have attained to great skill and reputation through many an experimental quagmire, and, it may be, a multitude of mistakes fatal to the dental organisms of his patients; but the rising generation of dentists do not consider this. They point to these self-made men as proofs of the needlessness of dental schools — proofs that skill, reputation, a competence, may be obtained without their aid. In this way, such men are stumbling-blocks to the younger aspirants for professional excellence; for they do not consider that their models would now be greatly in advance of their present status if *they* could have begun where the most advanced men then were.

But, says one, "I am engaged in a full practice, and cannot leave it to attend lectures." This may be so; but there is still

left to you the offer made by the Pennsylvania School. "True," he responds; "but I commenced practice in 1853 — just too late to profit by their offer." Well, you do seem to be hemmed in by difficulties; but still there is hope, for the gentlemen of that school are sensible men, and will doubtless be willing to modify their rule to suit the class of cases to which yours belongs. Besides, all the schools will soon adopt plans suited to cases such as yours. My advice to you is, to get down your anatomy, physiology, pathology, chemistry, &c., and go to work in real earnest, if you propose to be examined for a degree. The knowledge so obtained will be found useful, both at the time of examination and subsequently.

Another complains that he cannot attend lectures because he resides far from the schools. This may be true; but he can study at home, can read the journals, and, unless a resident of a sparsely settled country, may have the benefit of association. Besides, every such dentist makes an occasional pilgrimage to the great commercial centres, and, at one of these times, he can be examined by the properly constituted authorities.

A third gentleman complains of poverty, and makes that an excuse for not attending lectures. "Where there is a will there is a way." If you are honest, you can easily get money on time, or the faculty will take your note, payable at an accommodating period; but if you are not strictly honest, my advice is not to *attempt dentistry at all*, until you become so. Further, all the advice given the second gentleman, will apply to your case. "But," says a fourth, "I have no *inclination* to study. I can manipulate beautifully — do anything with my muscles; but when it comes to the matter of poring over books to get a knowledge of the principles which our literary gentlemen tell us underlie correct practice, it is extremely distasteful to me." Ah! my dear sir, yours is a very common difficulty, but it is not incurable. We do, almost every day, much that is not agreeable to us, because duty demands it. My advice is to

commence and prosecute a regular course of study. Take, for instance, some standard work on chemistry and another on anatomy. Devote one hour in the morning to the chemistry, and one at night to the anatomy, and, my word for it, one month will not have passed before the study, instead of being irksome, will be delightful. But if you are incorrigible in your repugnance, my advice is that you turn your attention to some other calling where you can do less harm.

To enable old practitioners of acknowledged merit to favor education by ceasing to be the refuge of such as do not admit the necessity of dental schools, *honorary* degrees have been conferred; but they have been abandoned, for the reasons that they are unjust to the regular graduates, subject to abuse, create jealousies, and tend to lessen the value of a diploma.

In order to the general diffusion of professional knowledge, the expense for tuition must be made to come within the means of all; and I undoubtingly believe that, if the price should be brought down to one hundred dollars, the schools would greatly increase their prosperity and do a thousand-fold more good than they now do.

It is well known that even among men who would be entitled, on examination, to receive certificates of qualification, no two have exactly the same amount of qualification; and yet, by our present system, all would receive the same undiscriminating parchment and be placed upon a common level. It is not likely that exact justice will ever be done in this particular, but we can greatly improve on our present system by accepting the precedent of our literary institutions. For instance, after the D. D. S. has been in successful and honorable practice for five years subsequently to receiving his initial degree, let him receive the second degree; or, if that amount of honorable practice has been had before the granting of the first degree, let him receive the second in place of the first. Subsequently, for particular eminence, let the third and highest degree be conferred.

These will be analogous to "bachelor of arts," "master of arts" and "doctor of laws." This will be a stimulus to study and improvement subsequently to attendance upon lectures.

Lastly, I wish to urge the plan of recognizing qualification alone, and not the time which any man has spent in trying to become qualified. If an applicant for a degree has the requisite knowledge and skill, if he is prepared in every way to be a practitioner of dentistry, what does the community care and why need the examining board care, where, when or how he obtained them? What matter whether by study and patient investigation at home, whether from some savant's private instruction, whether by attendance at dental colleges, whether by all these combined, or whether he received them through a sort of blow-hole in the top of his head, what matter? If he has it and it is a genuine article, is not that enough?

I know that *precedent* is against my proposal. I know that in all countries, all trades and professions, in all universities and schools, dolts have been graduated on time, with barely the vestige of merit. A pupil stays so long a time (no matter whether he employs half of it profitably), pays a given amount into the fund of the school, and is granted a parchment. I do not propose this to enable men to get honors they do not deserve, and get them easily. I would have the examining boards much more strict and exacting than they now are. Let every graduate be required to be competent to practise medicine, surgery and dentistry, if you please, but let us not be so bound to the past that we must continue to repeat the folly of centuries. Already the Pennsylvania school has taken a step in this direction, and it remains for her to apply the same principle to all pupils, and to let 1852 go to the moles and the bats of so-called conservatism. Do you say, "Anybody can get a degree, if your method shall prevail?" "Amen! So let it be," I respond.

But, mind you, he must earn it. There is no reason why this method should be more subject to abuse than the old.

Now, it must not be supposed that I propose to abolish the lectures, and make the faculty a mere examining board. That is very far from my design. I would have men entitled to the privilege of examination at the beginning of the term, on the payment of a moderate fee, say one hundred dollars, and then no further fee shall be required of him, whether he attend three courses of lectures, or none at all. If found competent, he should have his diploma; but if deficient in any branch, let him be told, "Why, dear sir, we find you somewhat lame in your anatomy and chemistry" (if those are the ones); "we advise you to read up on those branches, and try again," then he can attend the lectures, or study at home, as best suits his circumstances.

And, gentlemen, now that we are taking long strides in professional progress, would it not be well to encourage our schools to break loose from established usages which impede their progress, and impair their usefulness?

DENTAL EDUCATION.

BY

C. P. FITCH, M. D.

MR. PRESIDENT AND GENTLEMEN:

Educational interests are the most important interests connected with man's present sphere of being. Indeed, education lies at the foundation of all progress. It is this which distinguishes man from the brute, that elevates him in the scale of moral, intellectual, and physical being.

The grouping and consideration of man's privileges and duties are the insignia which point back through the ages, and faintly shadow forth the several stages of his past and present development; while present attainment opens the vistas of the future and incites to arduous effort for the rapid unfoldment of man's true moral, intellectual, and artistic natures, in working out the problem of human greatness and destiny.

No age has ever produced a universally great man; but many have shot athwart the zenith of the times in which they lived, truly great in the radii of acquired specialties. It is from this stand point that I wish to present a few thoughts to you upon the subject of dental education.

I believe it is claimed by the best educated dental minds, that dentistry is a medical specialty. How far this claim is admitted by the medical profession I am not able to say; but true it is, that in a lecture before the American Dental Association at its last session in the city of Chicago, this doctrine was enunciated and

ably maintained by a distinguished professor in the Rush Medical College.

That dentistry has claims to be recognized as a specialty of medicine, will, I think, be made quite apparent to any who may take the trouble or devote the necessary expenditure of thought to give the subject a thorough investigation; and though they bring hoary-headed prejudice to the task, yet if honest and faithful, they will rise from the research convicted if not converted men. While dental education embraces the mechanical and artistic, it by no means ignores the medical and surgical phases of the question. The claims which an intelligent public have upon those practising this specialty, place it beyond controversy, within the domain of both medicine and surgery. What then are some of the prominent characteristics of a dental education? Where may we look for its fullest manifestation? And what time is requisite for its acquisition?

These questions are plainly propounded, and I propose to give utterance to sentiments grounded in personal conviction, let the line of either commendation or censure fall where it may.

It has been said that education forms the common mind; but it may with propriety be said that education finds readiest lodgement in receptive minds, and that it has no affiliation with self-conceited arrogance, but flourishes best in generous natures.

Education, primarily, has reference to the culture of man's moral and intellectual natures, to the consideration of questions of an ethical and philosophical character. Whatever there is in physical science, though highly important, it must ever hold a secondary relation. If then we would produce stalworth dental minds, minds that command respect and influence on account of intrinsic greatness, they should be cultured pre-eminently in their moral sentiments, and in the range of their affections, as well as schooled in all that is profound in philosophy and intricate in science; but principally should they excel in physiological, pathological and mechanical studies and attainments.

A dry detail of the subjects which come legitimately within the range of dental investigation would not, perhaps, at the present time, be either profitable or pleasant; but you will indulge me a moment while I glance at the more prominent ones that should command the thought and enlist the earnest, prayerful attention of the student.

Dental education presupposes preliminary training, primary culture. The pupil should bring to this professional department a mind well versed in all that can be acquired in the academic, if not in the collegiate hall, or, in other words, he should possess a thorough English education; and if classic lore is laid under contribution in his preparation, so much the better. He will be familiar, at least, with some scientific truth, and will have secured a knowledge of language, the vehicle of thought, and how to master difficult, intricate subjects at the outset, and so the better be prepared to push investigation in the direction of his chosen specialty. It must be a radical defect, an ever present incubus upon earnest aspiration to see the avenues of science open to one's eager gaze and ever and anon feel conscious of destitution in all the essentials of a common school education, or feel no claim to be recognized as possessing a knowledge of one's own mother tongue. In view of the facilities which now present themselves to all aspirants for an elementary education, no gentleman who has either ambition or enthusiasm sufficient to awaken in him a desire to practise dentistry, with the expectation of reaching eminence, will be found thus destitute.

Descriptive and microscopical anatomy, physiology, pathology and surgery, in connection with materia medica, or so much of it as is applicable to dental practice, dental chemistry, and a high degree of manipulative expertness, are primary in importance to the operative dentist, while regional descriptive anatomy, chemistry, metallurgy, mechanics, etc., together with skill and manipulative ability, are equally important to those supplying artificial dentures.

These departments of practice naturally divide themselves, each requiring peculiar qualifications in the incumbent, in order to the attainment of any considerable degree of excellence in either. These subjects, with others which might be mentioned, should be thoroughly mastered before commencing practice. Superficiality, even when coupled with genius, is in no respect a passport to professional eminence. Ripe scholarship and profound attainments, when rendered severely practical, are often put to the severest test while meeting the claims of professional duties.

For instance, in order to treat most efficiently any one of the many oral diseases, one should be conversant with the entire roll of physiological and pathological actions, which are really summed up (but not generally so understood) in the single word "nutrition." He should also have at his command the most efficient remedial agencies, and a knowledge of their uses as applicable to the entire range of oral diseases. He should in addition possess the facilities, the ability, and the expertness for the performance of surgical operations whenever the case demands surgical interference. He who looks long into this subject will find it too profound for superficial gaze, and will find himself settling into inextricable confusion — "confusion worse confounded" — if he stops short of those depths whose foundations are granite and whose waters are clear as the sparkling rill that leaps from the mountain's base.

Ours, gentlemen, is no insignificant calling, and the requisites of education are in no respect short of a full curriculum of medical study, with several addenda appended, in the direction of special qualifications. These addenda are multiform, but all may find embodiment in the single phrase — an educated, Christian dentist.

The second branch of my subject makes inquiry concerning the place where the highest or the most elaborate dental culture may be obtained. Dental students are now educated, as a

general thing, in the office of the private preceptor, and at the dental college. As there are exceptions to all rules, so there are exceptions to this. Now and then a self-conceited upstart, with little or no preparatory culture, and with less experience, trusting to a good address, but even destitute of this at times, but principally relying more upon brass than brains, will push himself into the very eye of society and modestly lay claim to all the dental erudition and expertness that take years of toil and study to acquire. To say that all such should be handled by the profession, without gloves, is but another mode of giving expression to censure and rebuke, which is richly deserved, and should be administered whenever the occasion requires.

A private preceptor, if zealous and faithful to his charge, can be of incalculable benefit to his pupil. But it is generally the case that those practitioners whose instructions it would be, or is generally thought to be desirable to obtain, are the very men whose time is preoccupied by a press of business. And to the conservative men of our profession who do not keep pace with advances in operative dentistry this remark is, in some instances quite applicable. Some in this category stand deservedly high, but they belong to a period which is rapidly passing away, if not already passed. It is to be desired that all such will be under the necessity of making a record of advancement, or we fear that "Ichabod" will be found written over against their names, — the glory is departed. With this latter class, the pupil of dentistry is seldom if ever admitted into the sacred place, the operating room, to witness for himself the skill and expertness of his preceptor, and the results of his earnest efforts to conserve the life of the dental organs; but he must be contented to stand at a respectful distance, and receive truth if at all, through one sensual avenue of his being. But reforms in operative dentistry as well as mechanical, in the last few years have been marked, and especially have they been benefi-

cial to the student. With the use of the mallet his services are important to the attainment of results that at once and ultimately bless the patient, satisfy the operator, and furnish him (the pupil) just the opportunity for witnessing the most difficult mouth operations in the entire range of practice. The pupilage of such students is a perpetual clinic. If mallet operators had no other claims for superiority than this, (which I do not by any means admit,) viz: of furnishing to the student the most appropriate and efficient means for dental instruction, this alone in most instances should determine his method of operating. With the private preceptor, dental education must of necessity be fragmentary, and we must turn to the dental college for its highest manifestation and for the elaboration of those means and facilities which are at all adequate to meet the ends proposed.

The incumbents of chairs in these institutions of learning should be our most scholarly men, having natural as well as acquired gifts for instruction; both the ability to teach and the power to communicate should stand forth pre-eminent. The idea that any consideration other than ability and fitness should have the least influence in determining the occupants of these places of trust and responsibility should receive, at the hands of every intelligent dentist, that severe censure which it so deservedly merits. Give the colleges to understand that, whilst familiarity with authority is recognized as highly essential, yet something more is requisite, in the line of accomplishments, than the ability and effrontery to compile one or a series of lectures from authors whose teachings are nearly, if not quite, obsolete.

The defects in collegiate teaching, if any, seem to me to lie in the direction of carrying out in detail that which the prospectus indicates as the range and scope of study embraced in the curriculum. The subjects set forth in the collegiate course are full and ample, covering the entire range of subjects neces-

sary to be investigated. But lectures upon them must, in some instances, be partial and fragmentary. This arises from the fact that each chair has more assigned it than can well be performed. The number of professors should, therefore, be increased.

Paucity of clinical instruction is another serious defect in collegiate education. This method is at once the most feasible and direct for communicating and enforcing truth. This department should be committed, not to the dental novitiate, but to men of ripe dental erudition and of the largest possible experience, and at the same time, skilful and expert in the most approved methods of manipulation. Our colleges should also give during each term a series of conversational interviews, where the professor and student may propose and answer questions, until the entire range of dental truth becomes luminous and is brought to the clear comprehension of the dullest intellect. Then would dental attainments in each individual stand upon merit, and none but those able, or at least willing, to pass this scorching ordeal of personal catechisation would ever aspire to fill such places of labor and responsibility. Then would dental principles and practice, as manifested in the student, sparkle with the profoundness and freshness of modern acquisition. By the inauguration of such auspices, the dental student would feel the invigorating and modelling touch of the *master*, and bless in turn the community whose confidence had been reached and secured in the knowledge and fact of his graduation.

In one word, gentlemen, our colleges would then, as they are now, in many respects, be the exponents of all that is known in dentistry; and the ablest men in the country would be placed in the several professional chairs.

The third division of my subject, is the time requisite for acquiring a dental education. "Dental education." It strikes me that there is something significant in these two words. They

embrace very much of both science and art. They suggest subjects, the variety and profoundness of which cannot be surpassed, if equalled, in the entire range of human thought.

There is an imperative necessity of mastering these subjects, and the time requisite for the accomplishment of this purpose must necessarily be extended. You cannot stuff the mental stomach with thought, as you would stuff the crop of a turkey with meal. There must be time for intellectual digestion and assimilation. If too much is attempted in a given time, the entire labor is lost, and superficial attainment is the result.

In view, then, of the extent of the research to be made, of the vastness of the labor to be accomplished, and the character and variety of the subjects to be investigated and comprehended, we affirm that the time allotted to dental preparation is entirely too short. After a careful investigation of this subject from a medical, dental and practical stand-point, I am more and more impressed with this truth, that no practitioner of dentistry should take a student for a term less than five years; with the express proviso that in the mean time he shall attend three full courses of lectures in some one of our dental colleges. Is this asking too much, gentlemen, of our dental students? Before answering this question, let each professional gentleman present, who has practised a decade of years, and who has reached any eminence at all, pause, and look back over this eventful period of his life, and note the hours, the weeks, the months, yea, even years of mental toil and close application, which have been expended for the attainment of this dental distinction, whatever it may be. I say, let him pause and take this retrospect before deciding this question. No, gentlemen, the time I have set, if anything, is yet too limited. With many, it is to be feared, could they be subjected to the ordeal of an impartial examination, that the terminus of the five years would find much of an important practical character yet in the acid stage of digestion;

and principles that should be as familiar as household words, yet in the hazy regions of uncertainty and doubt.

Could the student be impressed, at the outset, with the importance and correctness of these views, very much that is of a cloudy nature would be lifted from his apprehension. Were the examiners in the dental college in every instance high-toned, thorough, and impartial, in subjecting all who apply for graduation, to a lengthy, rigid examination, and license none who did not fully pass such examination, a class of educated minds would soon crowd the dental ranks, that would make it imperative for the dental conservative to look sharply after his laurels.

I hope the time is not far distant, when all that is noble, generous, great, — all that appertains to moral, social and artistic culture, so far as it shall be made applicable to dental development, — all that is profound in philosophy, extended and minute in science, — all that is exact and practical in manipulative ability, — may find expression in those who are the appointed exponents of dental science and art.

Let us then, gentlemen, add our individual might for the achievement of such a glorious consummation.

REPORT OF COMMITTEE ON DENTIFRICES.

BY

J. McMANUS, D.D.S.

Your committee would respectfully present the following Report for your consideration:

Within the past few years the public have been either fortunate or the reverse, in having offered to them a number of preparations extensively advertised and extravagantly lauded as proper to be used as aids to the brush in keeping the teeth clean, and the gums in a state of health.

The success of the original speculator in this direction, has induced many others to prepare preparations equally efficacious, as well as wonderful in their properties, the virtues of which they announce through the columns of the daily journals, flanked with recommendations from members of the medical, ministerial and editorial professions, and a goodly array of names from the Honorables down to the ordinary run of men and women who state in praise of their favorite preparation, that it leaves the mouth with a pleasant taste after using it.

The fact that there has been apparently such a diversity of opinion on this subject among those practising in our profession, has in my opinion evoked this state of things. We are looked up to by many as conservators of the health of the dental organs, and we should be a unit, as to what should constitute a safe, popular dentifrice. The promulgation of a formula from this Association, would open the way for practitioners to speak more earnestly favoring the constant use of an article having the sanction of the profession, and it would be gladly hailed not

only by the profession, but by the public as an advance step in the right direction.

Your Committee recognize that in presenting a report, they are considering the subject of a popular dentifrice; ignoring those cases that require operations and special treatment, as well as that other class of individuals who desire a Sunday or holiday dentifrice, to be used on special occasions only.

We should combine in a dentifrice antacid, astringent, tonic, antiseptic and mechanical properties in proportions to meet the majority of cases. Such a preparation may be recommended confidently as beneficial, and under no circumstances can it be injurious to tooth substance.

Having devoted some little time in looking over medical and dental works of authority and such other works that we could procure, we have collated a number of formulas, setting aside all such as had ingredients that were objectionable in a dentifrice, and from frequent consultations on the subject with many of my professional brethren, I find they all advocate the use of prepared chalk, Peruvian bark and orris root, as a basis for a dentifrice, allowing a difference of opinion as to the addition of castile soap, carbonate of soda, sugar and other preparations, to render it palatable. While we know that a good dentifrice is a simple preparation, we deem it proper to call in the aid of these essentials, which will rather tempt to a free use, and so favor the addition of sugar and flavoring oils in sufficient quantity to render pleasant and palatable.

We would therefore recommend to the Association the following formula for a tooth powder.

R	Prep. chalk	℔iij.
	Pulv. Peruvian bark	℔ij.
	Pulv. orris root	℔j.
	Pulv. white sugar	℔iss.
	Pulv. Castile soap	ʒ i.
	Carb. soda	ʒ i.
	Oil sassafras	gtt. 80.

Also the following, for a tooth paste.

℞	Prep. chalk	℔iij.
	Pulv. Peruvian bark	℔ij.
	Pulv. orris root	℔j.
	Pulv. white sugar	℔iss.
	Pulv. Castile soap	℥ i.
	Carb. soda	℥ i.
	Glycerine	℥ iij.
	Honey	q. s.

Mix, to form paste, and perfume as desired.

REPORT OF COMMITTEE ON DENTAL LITERATURE.

BY

A. HILL, D. D. S.

The undersigned, being chairman of the committee on Dental Literature, appointed at the last annual meeting, having received no assistance from the other members of the committee, asks leave to submit the following as his report:

Until within the last thirty years it could scarcely be said that such a thing as dental literature existed in this country, and with the exception of an occasional pamphlet, fly-sheet, or some brief popular treatise issued here and there at long intervals, and some of these mostly for advertising purposes, there was literally nothing that could maintain the slightest pretension to Dental Literature save possibly a few musty old volumes of Hunter, Fox, Berdmore and Bell, copies of which could scarcely be obtained at any price. Indeed, the memory of our oldest practitioners easily runs back to the time when the profession could not boast of a single journal published in the interest of the Dental profession in the United States. It might be said, perhaps, that some two or three highly favored individuals were the fortunate possessors of a few volumes drawn from some of the publishing houses in Europe, which gave them a decided claim to eminence in this particular. But as for Dental literature, with these meagre exceptions, we had none. Indeed, at the commencement of the present

century, there were but about fifteen or twenty dentists in the whole country, and nearly all these uneducated and illiterate men, totally ignorant of the anatomy of the human system, and of the laws of health and disease, their whole stock of professional knowledge consisting in what they had learned from a few awkwardly performed operations, which in a large majority of cases had been productive of more injury than good to the teeth upon which they had been performed.

The name of Gardette, of Philadelphia, stands out in the history of our profession as a landmark; and he being almost, if not entirely, without companionship as a medically educated dentist in this country, must ever remain conspicuous before all succeeding students as emphatically "alone in his glory." He probably brought with him from France the only treatises upon the teeth accessible to the profession in this country at that time, which were those of Hunter and Berdmore, and it is quite doubtful if more than a single copy of these had at that time found their way across the Atlantic.

We had then no literature of our own, and no facilities for the acquisition of a knowledge of the dental art, but such as might be gathered here and there, of the most imperfect kind. But he, possessing what at the time must be considered rare advantages, wrought well for himself and his profession, and has left a name which those who come after him might well covet.

In a very interesting report presented to the association at its meeting in 1864, by Dr. C. P. Fitch, there seems to be one or two slight historical errors, to which we may briefly allude. He says, "Mr. John Greenwood was the first native American Dentist. He commenced practice in the city of New York, in 1778, and for many years up to 1790, was the only dentist in that city." In a biographical sketch of John Greenwood, contained in Harris' Dental Dictionary, it is there stated — "that finding himself without the means of support,

or any available profession, he visited his youngest brother, Clark Greenwood, who was in New York practising dentistry." It thus appears that Clark Greenwood preceded his brother John in the practice of dentistry in New York. Again he says: "Soon after this, Hudson Hayden, Kœcker and others came to this country," etc; thus conveying the impression that Hayden was a foreigner. Hayden was eight years the junior of John Greenwood, and was not a foreigner, but a native of Windsor, Ct. And it is with no little satisfaction that the writer of this report, himself a native of Connecticut, claims at least one distinguished name among the fathers, and a distinguished light in dental literature, as hailing from his own native State.

Among the fathers of American Dentistry then, we have Gardette and Hudson of Philadelphia, the former a Frenchman, and the latter an Irishman.

We have the Greenwoods [Clark and John] in New York City, and Hayden in Baltimore — all New Englanders. The two former natives of Massachusetts, and the latter of Connecticut. And although these facts may not be regarded as of great importance, they are not however without interest on the present occasion.

But the publication of the "American Journal of Dental Science," marks the grandest epoch in the dental literature of this country. This publication was commenced in June 1839, under the editorial charge of Drs. E. Parmly of New York, and C. A. Harris of Baltimore. Its publishing committee consisted of three persons, viz.: Eleazer Parmly, Elisha Baker, and Solyman Brown, of New York. It was at first issued monthly, but afterward quarterly, and its title was changed to the "American Journal and Library of Dental Science," and subsequently came under the editorial supervision of Dr. C. A. Harris, of Baltimore. The Journal consisted at first of forty-eight octavo pages per number. One-half of its pages were occupied with the re-publication of standard works on dental theory and practice, and

the other half devoted to the current literature of the profession. From this period dentistry sprang forward with a bound truly wonderful. About the same period, the Baltimore College of Dental Surgery came into existence, and the first Vol. of the Journal records the organization of the "American Society of Dental Surgeons."

Here, then, we date the rise of dental literature in America. The establishment of this dental journal, as a vehicle for the interchange of professional ideas, and a nucleus around which the finest and best thoughts of the profession might crystallize themselves, was hailed with gladness and delight by most of the members of our fraternity throughout the land. It is true, a few captious spirits stood aloof, who acted as though "they were the men, and wisdom would die with them"; but the Journal soon became the potent instrument by which quackery and charlatanism were mercilessly scourged, and a lever by means of which the profession was elevated above the domains of empiricism, and lifted into an honorable and useful calling. And as we now re-peruse those pages, which we read with so much avidity when they were first published and sent forth to the world as the harbingers of better days, we cannot resist the conviction that they will bear a favorable comparison, in point of ability, with the best publications of a similar character of the present day.

And the writer of this report would feel himself culpable if he should dwell less at length, and without marked emphasis, upon a portion of history at once so important and interesting. And when we say "there were giants in those days," we mean not to affirm that their successors are pigmies, but simply to follow the scripture injunction in rendering "honor to whom honor."

A host of writers appear upon the stage about this period, or very shortly after, whose very names, were they reproduced here, would glow and sparkle with the scintillations of more

than ordinary genins, and could not fail to conjure memories that should always live in the minds and hearts of their successors.

The very inception of an enterprise like the one under consideration, linked with another, or even a third, of equal, or perhaps of still greater importance,—such as the organization of a national society, and the institution of a dental college, the first institutions of the kind in the world,— plainly reveals the important fact that those were master minds that so moulded and shaped the destiny of the dental profession in the United States. And they of all other men were best fitted to give tone and character to its incipient literature.

In thus tracing the history of dental literature in this country, in its earlier stages, we are inspired with admiration for the men through whose labors and instrumentality the very ground-work of its subsequent character and eminence was laid. And of all the dental periodicals that have since found their way into our hands or fallen under our notice, we certainly mean no disparagement when we say, that none has ever come to us with more portly dignity, touching their artistic and typographical appearance, or with stronger claims upon our support and patronage, for the intellectual and intrinsic excellence of the matter which they contain, than the "American Journal of Dental Science," as issued under the editorial supervision of that great light in American dental literature, Chapin A. Harris, of Baltimore. If we could afford space here simply to catalogue the names of its distinguished contributors, we should present at once the pledge and the evidence of its marked superiority. And perhaps we may be excused from expressing, in this connection, our profound regret that its publication has not been continued to the present time. But it nobly fulfilled its mission — had its day, and expired. Yet, notwithstanding, it comes to us no longer, at the beginning of each quarter, with its mass of valuable matter, its clear

typography, its fine illustrations and its imposing form, yet it lies upon the shelves of our library, a source of continual inspiration, and will thus continue for years to come.

As we descend, the stream of dental literature enlarges, spreads, and becomes more diffusive; and if it does not come to us now with the same material dignity, it comes with varied form and in multiplied numbers. The mind and thought of the dental profession received such an impulse, and became so stimulated by these first great and radical movements, that other channels were cut for its free emergence. And thus several dental publications followed each other in rapid succession, each contending for the patronage of those, in whose interests they were published, and all calling aloud for contributions, so that a fine opportunity was afforded for the freest and fullest interchange of thought and feeling upon all subjects connected with the theory and practice of dental surgery. Many of these contributions consisted of brief items or practical notes. Others, more elaborate and speculative, followed, until nearly every department of dental science and practice was more or less ventilated, and no excuse was left for the ignorance of any practitioner, at least upon the general subjects involved in this specialty. And by such facilities, a new class of writers have been educated, who are now dispensing the literary pabulum by which public opinion is being shaped and moulded in the interests of our science.

Perhaps a severe criticism would expunge much that has been written, as superficial and worthless; but, under the circumstances, it would seem to us that a more liberal and lenient treatment is demanded at our hands. It is well known that only after long search and the examination of much ground that one diamond is found. So tons of earth are often washed for a few grains of gold. But if the gold is found at last, we are content with our labor. Thus, thought, brilliant and beautiful

only gleams on our vision after much patient toil and searching in the varied fields of literature.

It is indeed remarkable how sparsely real ideas, — living and vital — are scattered through wide spreading and pretentious volumes. Among the thousand and one works which yearly come groaning from the press, how little is really new, vital, or important. With scores of them we might conclude our reviews by writing on the fly leaf of each, — *verbiage, verbiage, verbiage.* And if we should put many of our more pretentious articles in the crucible of hard common sense, the residuum would be — *verbiage, technicality, nonsense.*

Some writers are as remarkable for mystification, as for volubility. They confound ideas by mere words and phrases. Imitating the abstruse and metaphysical they befog the intellect. In attempting to be recondite, they become lost in the vagaries of the brain. In attempting to be profound, they sink into an abyss of darkness. These evils, perhaps, might be obviated, if men would never write until they had something to write about; if they could learn first to think clearly, and then write as they think. No literary production was ever yet made luminous without ideas, and no ideas are vital and important unless truthful; and a multitude of words can never compensate for the lack of ideas. We would not be understood, however, as condemning the effort to elucidate that which has been presented before. Some men are able to take up and discuss old and trite themes, and render them exceedingly attractive by their genius. Under the play of a vigorous intellect, much new light is thrown upon old subjects, and some are made to fairly sparkle and scintillate with the mental coruscations of the writer.

In a review of Dental Literature, such remarks as the above are spontaneously suggested, and will not, we think, be deemed inappropriate. Much that is written is simply a rehash of

another's ideas, and, in many cases, not much improved by running through another mould.

Men do not become finished writers at the first dash, and we do not think it at all disparaging, considering the shortness of the period since we may be said to have had a dental literature in this country, that we have no more first class writers at the present time. On the contrary, we think it highly creditable to the profession that we have so many really good ones. We are indeed happy to believe that we are even now educating good writers on dental subjects, at a far more rapid rate than at any previous period of our history.

We think that a careful and candid review of dental literature for the last thirty years will show a marked improvement in respect to the character of the subjects selected for investigation, as well as the methods of investigation which at the present time are being pursued. Subjects the most recondite and difficult, involving extended observation, careful analysis and delicate manipulation, and which, a few years since were almost entirely ignored by members of the dental profession, are now passing under the field of critical and careful observation. And these observations are assuming the highest importance in point of physiological and pathological interest.

In this connection we can but speak of the microscopical results, which the patient and laborious researches of some of our most thoughtful and plodding confreres are bringing to the attention of the profession by the publication of their minute and exquisite investigations. A few years since the names of Nasmyth and Tomes were our highest and best authority upon these subjects, and no American author could venture to divide with them their well deserved honors. But if we read aright the signs of the times, that day has passed away forever, and American Dental Literature is now enriched with the results of microscopical researches equal to anything known to our profession in any other portion of the world.

Dental science in America is characterized by a boldness of investigation and practice that really challenges the admiration of the world, and we know of no class of men more persistently earnest, more doggedly obstinate, or more hopefully determined in the prosecution of their labors than the Dentists of America. Every department is brought under the strictest surveillance, and the most careful inspection that can possibly minister to or facilitate the objects which are sought to be accomplished. The field of Dental Literature is thus being enlarged, as our investigations embrace a wider scope and greater range of subjects.

Another characteristic of our present literature, and one full of promise for the future, we think, is found in the fact that greater attention is paid to the study of general physiology and comparative anatomy, than formerly, by students of dental science. Perseverance in this direction is sure to be richly rewarded at no distant day.

We are not aware that any additions have been made to the number of dental journals since the report of last year. The Register, Cosmos, Dental Quarterly and Dental Times, are still issued as formerly, and still serve to mould the character of our periodical literature. We have been designedly more general than specific in our strictures and criticisms, and do not deem it essential to pass in extended review these several publications. Were this important, we should doubtless find much in each of them to commend, while a fearless and candid criticism would compel us to deal severely with some things they publish. One prominent difficulty stands in the way of achieving the highest ideal of dental journalism, and if we may be allowed to name it, it is simply the want of a liberal support.

The fact is humiliating, but quite instructive, that but few, comparatively, read the journals at all, and a less number subscribe for and support them. This fact was most distinctly brought out a few months since, by Dr. L. D. Shepard, in a paper which we had the pleasure of hearing him read last

fall, before the State Dental Association of Connecticut. The expense, time and labor, essential to the production of a first class journal are such, that only those whose circumstances of a pecuniary nature are equal to the tax upon their time, and the outlay of their money, can afford to do it. These circumstances, united with large benevolence and a love for the profession, may continue to supply us with a very creditable dental literature, notwithstanding the lack of patronage referred to. But we are persuaded, from some little experience in the past, that if the list of paying subscribers could be at once largely increased, our dental journals would soon show the results in a way most pleasing and creditable to the profession. Perhaps the " Cosmos " would be as little affected by such an increase of subscribers as any of these journals, yet even here, notwithstanding the ample resources and large-hearted enterprise of its publisher, we should anticipate a marked improvement. Dentists sometimes complain that our journals are simply convenient vehicles in which to advertise for their publishers. But this is we think the surest pledge, and perhaps the strongest, of their continued publication. To those who thus complain, we would say, don't quarrel with this element of stability until the list of paying subscribers is largely in excess of what it is at present. If there be an exception to the foregoing remarks, we think, the Dental Register, edited, published and sustained by the unwearied labors of Dr. Taft, is entitled to this distinction. For our own part, we are glad if any of them can make it profitable to advertise their wares in a manner at once so convenient to themselves, and so useful to the profession.

Since the last report on Dental Literature, three new works have been added to the list of Dental publications, viz: one by Dr. Ziegler on Nitrous Oxide, one by Dr. Wildman on working rubber, and still another on Nitrous Oxide by Dr. Barker. These works though small, still add something to Dental Literature. We are aware, that the value of a book does not always

depend upon its size. And there may be works of much greater pretension, having much less merit. Candor, however, compels us to say, that we have not had an opportunity to examine these several issues, and therefore we do not attempt to speak of their relative merits. But from the well known reputation of their authors, it is fair to presume that they contain matter of importance and interest to the profession.

There is still another feature of the Dental Literature of our times, to which we may properly advert, and which we can safely commend. We refer to the published Transactions of the different dental associations of our country, which now, year by year are adding to the permanent literature of the profession. And, notwithstanding the matter contained in these several volumes, may all find its way to the outside world, through the medium of the journals, yet being published consecutively, and in due order as in the Transactions, and neatly bound in permanent form, they constitute a valuable acquisition to the library of every practitioner in the land. And in after times, it will be far more easy to trace the history of our profession, by reason of these volumes. Indeed, the current literature of dentistry finds its noblest expression in these Transactions.

The most voluminous specimen of this class is to be found in the "Transactions of the Odontographic Society of Pennsylvania;" creditable to the brethren of the Key Stone State. The "Transactions of the American Dental Association," as also the "Transactions of the Connecticut State Dental Association," constitute valuable acquisitions to the libraries of the members. These Transactions not only contain papers of distinguished merit and ability, touching the great underlying facts and principles of dental science; but they also contain reports of discussions on the varied topics which come before them, and the different methods of practice to which they are accustomed. And we must regard such reports as of great value; and the more so because they come to us stripped of

that surplus verbiage which is so characteristic of an elaborate effort by way of thesis or essay.

These discussions sparkle with the freshness and spontaneity of original thought and expression, and deal not so much with mere "glittering generalities," as with the practical detail of every day's experience. Here are practical hints for those who seek them, often of such value as to fully compensate for the entire expense and trouble involved in their publication. They have a permanent value also as works of reference. Bound in substantial form, they can be easily consulted in many a doubtful case. And beyond this they have an historical value, which at the present time, we can scarcely appreciate. Every such volume issuing from associations of this kind constitutes a nucleus around which is likely to gather the elements of a growing literature.

Your committee has named only these three volumes simply because no others have fallen under his observations. There may be, and he trusts there are others of equal if not greater interest.

There have been occasional spasmodic efforts to educate the general public in regard to the great principles which lie at the very foundation of all dental practice. These efforts have given ephemeral existence to several publications, which for a shorter or longer period have done good service as popular educators of this class. Of this kind was Stockton's Dental Intelligencer, published in the city of Philadelphia nearly thirty years ago. Subsequent to this, the Brooklyn Dental Mirror, published by Dr. Martin K. Bridges, was a very creditable specimen of its class, and was really a very welcome visitor to the office of every dentist in the country. Some years later, the "People's Dental Journal," under the auspices of Dr. W. W. Allport, of Chicago, whose liberality and public spirit sustained it for several years. And it is most seriously to be regretted, that for the want of financial encouragement, this very valuable journal,

the only work of its class in America, or in the world, has become extinct. The profession in this country, in the opinion of your committee, would very materially serve themselves and the public at the same time by resuscitating this, or in the establishment of another similar publication.

Minor efforts in this direction, in the occasional publication of pamphlets containing popularized dental principles, have been made at different times, and with varying results. A pamphlet of this class was put forth by Dr. G. F. J. Colburn, of Newark, N. J., many thousands of which have been scattered broadcast over the land, in the English, French, Spanish and German languages.

In conclusion, your Committee is disposed to take a cheerful as well as a hopeful view of the literature of our profession. As in all material respects, we have made the most astonishing strides within the last thirty years, even so we have created a literature, which, considering our antecedent circumstances, must be regarded as not only remarkable, but really surprising, — a literature highly creditable as to the past, and hopefully prophetic as to the future, — a literature partaking largely of the characteristics of American genius; at once audacious in its movements, free in its scope, and persistent in its efforts, challenging every department for something better, and aiming at the best, — a literature moving with the age; alive with the vitality of "Young America"; brushing away, with the utmost nonchalance, the old and *effete*, and persistently intermeddling with all that is beautiful, useful and novel.

CODE OF DENTAL ETHICS.

ARTICLE I.

THE DUTIES OF THE PROFESSION TO THEIR PATIENTS.

SECTION 1. The dentist should be ever ready to respond to the wants of his patrons, and should fully recognize the obligations involved in the discharge of his duties toward them. As they are, in most cases, unable to correctly estimate the character of his operations, his own sense of right must guarantee faithfulness in their performance. His manner should be firm, yet kind and sympathizing, so as to gain the respect and confidence of his patients; and even the simplest case committed to his care should receive that attention which is due to any operation performed on living, sensitive tissue.

SECT. 2. It is not to be expected that the patient will possess a very extended or a very accurate knowledge of professional matters. The dentist should make due allowance for this, patiently explaining many things which may seem quite clear to himself, thus endeavoring to educate the public mind so that it will properly appreciate the beneficent efforts of our profession. He should encourage no false hopes, by promising success where, in the nature of the case, there is uncertainty.

SECT. 3. The dentist should be temperate in all things, keeping both mind and body in the best possible health, that his patients may have the benefit of that clearness of judgment and skill which is their right.

ARTICLE II.

MAINTAINING PROFESSIONAL CHARACTER.

SECTION 1. A member of the dental profession is bound to maintain its honor, and to labor earnestly to extend its sphere of usefulness. He should avoid everything in language and conduct calculated to discredit or dishonor his profession, and should ever manifest a due respect for his brethren. The young should show special respect to their seniors; the aged special encouragement to their juniors.

SECT. 2. The person and office arrangements of the dentist should indicate that he is a gentleman; and he should sustain a high-toned moral character.

SECT. 3. It is unprofessional to resort to public advertisements, cards, handbills, posters, or signs calling attention to peculiar styles of work, lowness of prices, special modes of operating, or to claim superiority over neighboring practitioners, to publish reports of cases, or certificates in the public prints, to go from house to house to solicit or perform operations, to circulate or recommend nostrums, or to perform any other similar acts.

SECT. 4. When consulted by the patient of another practitioner, the dentist should guard against inquiries or hints disparaging to the family dentist, or calculated to weaken the patient's confidence in him, and if the interests of the patient will not be endangered thereby, the case should be temporarily treated, and referred back to the family dentist.

SECT. 5. When general rules shall have been adopted by members of the profession practising in the same localities, in relation to fees, it is unprofessional and dishonorable to depart from these rules, except when variation of circumstances requires it. And it is ever to be regarded as unprofessional to warrant operations or work as an inducement to patronage.

ARTICLE III.

THE RELATIVE DUTIES OF DENTISTS AND PHYSICIANS.

Dental surgery is a specialty in medical science. Physicians and dentists should both bear this in mind. The dentist is professionally limited to diseases of the dental organs and the mouth. With these he should be more familiar than the general practitioner is expected to be; and while he recognizes the superiority of the physician, in regard to diseases of the general system, the latter is under equal obligations to respect his higher attainments in his specialty. Where this principle governs, there can be no conflict, or even diversity of professional interests.

ARTICLE IV.

THE MUTUAL DUTIES OF THE PROFESSION AND THE PUBLIC.

Dentists are frequent witnesses, and at the same time the best judges, of the impositions perpetrated by quacks, and it is their duty to enlighten and warn the public in regard to them. For this and the many other benefits conferred by the competent and honorable dentists, the profession is entitled to the confidence and respect of the public, who should always discriminate in favor of the true man of science and integrity, and against the empiric and impostor. The public has no right to tax the time and talents of the profession in examinations, prescriptions, or in any way, without proper remuneration.

DISCUSSIONS

ON THE

REPORTS AND PAPERS

PRESENTED TO THE

ASSOCIATION.

DENTAL PHYSIOLOGY.

INTERGLOBULAR SPACES.

Dr. ALLPORT (Chicago). Nature works regularly and with a definite design in creating all her works. The same hand that creates and moulds the type also arranges separate organs and tissues; and while the same classes of tissues and bodies may vary somewhat in size and shape, the type remains always the same. Nature, when uninterrupted, is not so crazy and uncertain in her action as to commence and conclude a certain tissue at a given point at one time, and at other times commence and conclude the same tissue at other and very different points. The natural point for interglobular spaces in a healthy tooth is at the junction of the enamel with the dentine or cementum, and is always found there, unless thorough calcification has ensued. The dentinal tubes commence at this point, and, when not interrupted by some abnormal action in their formation, are continuous until they reach the pulp. The want of continuance in these tubes is owing to a lack of a proper assimilative force at the time calcification at this point was going on. When the interglobular spaces or granular masses are found within the dentinal structure, between the junction of the dentine with the enamel and the pulp, it is the result of an abnormal action, and should be regarded as a pathological rather than as a physiological condition.

Then again, if it is, as Dr. McQuillen states it to be, a predisposing cause of decay, it is the result of a debilitated action in some particular function, which is of itself enough to stamp it at least as the *result* of a pathological condition. Hence I

am of opinion that whether the drawing presented for our consideration be taken from a microscopic preparation of a developed or an undeveloped tooth, it should be considered as a portrait of a pathological condition, and not a normal one.

Dr. SUESSEROTT. (Chambersburg, Penn.) The premises of Dr. Allport, I think, are not well taken, inasmuch as Prof. McQuillen distinctly stated that under certain circumstances this condition could be considered a normal one, and under other circumstances, an abnormal one; the former, when found in the growing tooth of the infant; the latter, when found in the adult tooth. If the proposition of Dr. Allport be correct, namely, that if it were an exciting cause, it would be an abnormal condition; then, upon the same ground, could he pronounce the period of infancy an abnormal condition, for the reason that in the feebly developed system of the child we find the ravages of disease most active, and the power of resistance against all pernicious influences very weak, as compared with that of the fully grown organism.

Dr. LATIMER (New York) desired that the speaker should make a more definite explanation respecting predisposing and exciting causes.

Dr. MCQUILLEN. I distinctly stated that the *interglobular spaces, when present in teeth whose growth has been completed, are abnormal, and predispose* them to decay. As there appears to be an evident misapprehension relative to the exact meaning of the terms predisposing and exciting causes of disease, I will endeavor to define them. By *predisposing cause* is meant a defective condition, either hereditary or acquired, of some particular organ or of the entire organism, which tends to the development of certain diseases from exposure to those external influences which are very properly denominated *exciting causes of disease,* — such as sudden variations of temperature, inclement weather, insufficient clothing, food defective in quality or deficient in quantity, etc. If a person laboring under *predisposition*

to a given disease should be protected from *exciting causes*, the former may lie dormant for a long life; and that which is true of other portions of the organism is equally true of the teeth. In other words, if teeth in which these spaces occur are protected from external influences, — such as mechanical violence, acids, etc., — which would act as exciting causes of caries, the predisposition to the affection on the part of the interglobular spaces would remain dormant.

Dr. Atkinson (New York). This is a subject of too much importance to allow of time being taken up in matters not bearing upon the main point. A wise man once said, "The human eye sees only what the mind conceives." Every observer is influenced in his own observations by the degree of his development. The great trouble is that we are not willing to pass for what our observation has been worth. If we were imbued so strongly with the desire of knowing, that we could take our lives in our hands when we are making our observations, and search for the truths of science for the sake of those truths alone, and give our hearts to the labor without obscuring our view by the visionary allurements suggested by personal considerations, then we might take rapid strides in advancing the great truths of science, and prove by our labors that we are not merely tyros. I am free to acknowledge that I am but a tyro in microscopic investigations; but I can say that I have not seen the individual who can interpret some of the fruits of my own observation. Now there are two questions involved in this discussion. In the first place this discussion all originated out of an overweening desire of a teacher in this department to pass for a man of universal learning. I take it to be important at the outset that we should find out who best can explain the operations of the laws of nature, and can best portray them to the apprehension of those who are too lazy to make observation for themselves. It appears to me that it is not a physiological action which produces the result which we see here, in the con-

sideration of this topic. I have said before, and I say again, that Kölliker never saw what is represented in Kölliker's work in the United States, published by Lippincott at Philadelphia. I think it is the biggest falsehood out of jail. I do believe that the figure referred to in the Philadelphia edition of Kölliker's work was an interpolation, by mistake. I have spoke of an over-weening desire on the part of some gentlemen who come here to be reputed marvellously learned and I think that they have covered too much ground, and have proved themselves deficient in observation, and deficient in taking in the observation of others. And my esteemed friend who has spoken upon this subject has written his autograph where I was sorry to see it, and over what I think is a mistake. He has had these plates which he exhibits here prepared himself at his own expense and he has represented these interglobular spaces as the normal condition of this portion of the dentine, and as a condition that was usually found in these places and he refers to a published work for information upon this subject in place of making examinations and giving us those facts which would upon their very face pronounce these spaces to be abnormal. We are but tyros. Let us not claim to be anything more. The trouble is that we are not willing to say, I don't know. We pierce our souls through with many sorrows, and leave the scars; and though we pray "out, damned spot," it will not out; it will stay. Now how far do we understand the operations of these laws in the formation of dentine? When we speak of normal or abnormal structure, we should forget everything but our desire to know precisely what that structure is. Now were these interglobular spaces there through mistake? Had I been in Europe and seen the specimens which are to be seen there, I might be able to give you information from that source; but, as it is, I must be satisfied to read this tissue as it is. I must reach that copy as it is. I must read that which comes within the purview of my own apprehension. How do I pronounce it

to be a mistake? Simply because I have never found anything like it; and I can just take a little balsam and water and I will produce this same appearance as is here exhibited.

Now I cannot read whether these spaces are there by design, or a part of the organic structure. I cannot see whether it is an effort to produce a particular type. But I claim that it is not the result of what are called fortuitous circumstances. There is no such fortuity here. Nature does not work in such a manner. There is no mistake, and it is our business to learn how the law of nature operates in this matter. And there must be no mistake in regard to the facts which we hope to ascertain; for in settling our investigations we are either condemning ourselves beyond redemption, or else we are crowning ourselves with blessings. We must not work by mistakes when acting as redeemers and restorers of that which is lost, because in so doing we break the law of divineness which is operating everywhere. The mistake is, that men having eyes will not see. In the creation, God said, "Let there be light." If you would know that which is secret, you will labor earnestly and hopefully, and not with a mind tenacious of its own notions and preferences. The trouble in all this matter is that you will not make these investigations for yourselves. If we only choose to go to work in the spirit of true research and make observations, and then pronounce whatever comes to our apprehension as the truth respecting organology; and then, when that has been pronounced, to see to it that we do not magnify it beyond its legitimate proportions, we shall then have a standpoint by which to make measurement and admeasurement, with no deflection from it. And all outside of that, all that is pathological like this has no business in the discussion before us now. Every one who has discussed these questions knows how physiology and pathology always travel together; and we see how it is impossible for us to confine ourselves strictly to the subject-matter before us. I am glad in

my soul that it is difficult. If we could be drawn into such straight lines as these, our subject-matter would be of little use.

An inquiry was here made as to the relative size of the blood corpuscles and the dentinal tubes.

Dr. Atkinson. The dentinal tubuli are about ten thousand to the inch in diameter. The red corpuscle of the human blood is at the rate of from three to four thousand to the inch; so that the tubuli are between a quarter and a third as large as the corpuscles of the blood. The structures are different in different animals; but in the human body the size of the dentinal tubuli are from a quarter to a third as large as the blood corpuscles. So that you will see the impossibility of getting the larger body into the smaller.

A further inquiry was made as to how the corpuscles were produced.

Dr. Atkinson. You involve the whole question of organology. In the first place every body was once in a spirit state, and afterwards became etherial, and, after that, aerial, and then liquid and afterwards solid, until it comes down to silex, the most differentiated substance, so far as anything absolute can be presented to the mind, in material physical body. In the first place, then, you bring that infused indefinite pronouncement of body to the state of solidification, the elements coming closer together, until they have passed that ordeal, and the process takes place that marks out a line of new formation. That comes in the teeth on the line of demarcation between the enamel and the dentine. Now in this process, in some of the calcigerous cells the salts will be allowed to go free. And it resolves itself together, under the law of organology (because it is free) into a sphere or globe. Every solid body in passing to a fluid state, will express the typal presence of all bodies, and form itself in the shape of a sphere. These little spheres having become lodged in this magma, there will be portions left that are irregular in shape, being neither *liquor sanguinis* nor den-

tinal fibrils, and we have such an appearance as this which is presented here. Then after that lime has been laid together, the process goes on, and at the behest of that beautiful little intelligence which is working there, the different particles are brought down just where they are wanted, until finally by the law of organology another calcification of the dentine takes place, and so on until we have the old man's nearly solid tooth.

Dr. ATKINSON. *Evening Session.* — I have been informed, since leaving this hall at the close of the morning session, that I have not made the location of what I call the interglobular spaces sufficiently clear. Had I a diagram before me, I could make it clear to a child five years of age. The only proper locality of the interglobular spaces is at the commencement of the dentinal tubes, the cells directly between the enamel and the dentine and between the cementum and the dentine. It is the border land in which the forces to dominate are apparently at an antagonism, the dentinal forces coalescing so as to harden all that portion which is by some called "matrix," but which I prefer to call inter-tubular structure, or connective dentinal tissue. And after the action has commenced in the spirit forming stellate cells directly in this magma, each separate stellate cell becomes a foundation stone of the enamel rod. This is completed by the successive calcification of cells, making complete each enamel rod, each cell-wall making connective tissue of the enamel substance, and the fully calcified and obliterated cell making the balance of the structure denominated enamel rod. I tried to say this morning that it was because of this struggle going on between these two forces, that this tissue is, as it were, an imperfect structure, — calcification not being complete, all having to originate from the fluid mass, and there not being lime enough present to completely calcify this interglobular portion; and there were spaces left necessarily, yet not regular spaces. And still, when we say "space," we must reflect that it means that

portion which is uncalcified; for in strict parlance it is no space, it is filled with a colloid mass, an unpronounced structure, or, as it is said, a structureless substance. Through that substance, the mysterious agency of the currental movements that we denominate nutrient activity takes place. The only reason why there should be a space left is in consequence of the taking up of lime for crystallization, or rather, solidification, which (being only an effort towards crystallization) takes place and hardens the lime between these so imperfectly that we find the fine ends of the tubules running in the space filled with this colloid mass, through which the nutrient material, and these movements which are seen here, have their plane of action. Then as they coalesce, coming down, they are dichotomized. That can only be said when we survey them from the last portion of the formation. These approximate to each other, so that they form branches, the little streams forming the larger streams, and so being branches. And the tissue, being more confined in each one of these, becomes subject to the law of tubular forces, — the ghostly forces for so naming which I have been so severely criticised. Whenever any diseased action develops itself, from whatever source, and whatever it does, it has to deal with ghostly forces. The specimens here to-day would relieve us in this matter if they had been properly explained. I would suggest the propriety of confining the term interglobular spaces to nothing but the spaces, and then to determine with reference to them. And this magnificent and wise provision of nature is found between the enamel and the dentine, and when we have a rotten tooth in the mouth, it is said to begin in old enamels; and where, on the other hand, the enamel has been destroyed, the pulp may be extirpated and the canal filled with an indestructible substance, and we may still have, not a dead tooth, but a tooth with less than the normal amount of vitality. It is not a dead tooth — if it were, it would be a foreign structure. We have had many troubles with regard to these questions, simply because we are not willing to take them in a his-

tological point of view. That is the only difficulty I have with Prof. McQuillen. That is the mistake that he makes. There is no doubt that there is an approximation to truth, if we regard these drawings as diagrams. Now the point which I wish to make is this: that you will not befog yourselves by denominating this pathological condition a physiological act, and calling it interglobular space. I think I have pronounced now clearly, where the interglobular space may be found. And if you find it anywhere else, you may set it down as certain, that there has been an influence at work, which has taken the enabling circumstances from this mysterious agency, so that it does not normally perform its work; and we may have an appearance just like this, an appearance of tubules runing through this substance. These may be absolutely tubules, or they may be absolutely solid bodies. They certainly have different refractory power. I have examined them, but I could not see the action of any prescribed law in this respect. And here is a great trouble in our investigations. We are not humble enough and faithful enough to go to work. We make the preparations just square with what we desire to see ourselves. Men like to magnify the field of their labor. Now it is simply the blessed favor of heaven to admit human agency to the discovery of any idea. The man that does most is really the most earnest and humble student of nature; and when he has attained to the greatest amount of knowledge of the operations of this unseen agency, he will then appear to himself to have attained very little. There is not an earnest histologist on this side of the water that can be called more than a tyro. Though I have not read all that there is written upon this subject, and however humble the amount attained is, as I acknowledge it to be, yet I have been able in the best works to just see that the authors have not made the preparations themselves, but were willing to adopt falsity, and then cram it down others. And by that means

medical and surgical and dental scholars are required to cram their heads with such an amount of fiction that it is no wonder that we should so many of us be "swell-heads."

Dr. McQuillen. I do not consider the subject under consideration as a mere difference of opinion in relation to *technicalities*, but that it has been made a question of *facts*. The preceding speaker, while admitting the evident accuracy of the large diagram here presented of a microscopical specimen which he has never seen, has endeavored to make one of two points in the long harangue with which the members have been favored; first, that the appearance of an engraving published in the "Dental Cosmos" in connection with an article on the "Microscopy of the Dental Tissues" (although it agrees in all essential particulars with the drawing by Mr. Pettit), was either due to the presence of air bubbles from defective mounting of the specimen in Canada balsam, or, second, that a mistake had been made by the engraver of the *American edition of* Kölliker, and that writer should not be charged with an illustration which, it was more than probable, he had never seen and when it was exceedingly doubtful about its bearing any resemblance to the one in the *German edition*. The Association has been informed very gravely that the use of the so-called "incorrect illustration" is a great blunder, and this remark was made to me in Philadelphia a few weeks before by the same party, with the addition that "a blunder is worse than a crime." My response then, as now, is that the shallow sophism enunciated by that prince of scoundrels, Talleyrand, which some weak people are disposed to regard as an irrefutable aphorism, has no foundation in fact, or weight with sensible and just men. A blunder is never worse than a crime; the first implies an error of judgment or forgetfulness, and as all are liable to such things, there is a disposition on the part of men to forgive that in others which they are apt to commit themselves, while the second always indicates premeditation and with a deliberate intention to do the wrong thing; and although guilty

parties sometimes escape the punishment they justly merit, their crimes when known are invariably borne in remembrance against them, and not unfrequently serve to defeat some darling project they may have in view. Purkinje, when he discovered the *lacunæ* and named them *corpuscles* or bodies, made a blunder, for they are not bodies, but spaces; this, however, was only an error of judgment which subsequent observers have corrected, and it was by no means worse than a crime. In the present instance, had the engraving referred to been taken from Kölliker or his language used without due acknowledgment, it would not have been a blunder, but a crime, which would have been so humiliating that I could not, under such circumstances, have the boldness to hold up my head in such an intelligent and honorable body as is here assembled.

In response to the two points dwelt upon, I would say of the first that the air bubbles found in the defective mountings of microscopical preparations present a very different appearance from that in the diagram objected to, as I am ready to demonstrate by a specimen in which the air bubbles exist; and of the second that the engraver employed by me to illustrate the article in the Dental Cosmos cut the leaves out of the American edition of Kölliker, and *transferred* the illustrations taken from it to the block, so as to secure more accurate representations than could be obtained by copying them with the pencil. The evidence of this is before you in the *book itself*, which the members can see gives unmistakable evidence of the mutilation it has been subjected to in order to be *correct;* with respect to the *German edition*, through the politeness of my friend and former fellow-student at college, Dr. J. Da Costa (the editor of the American edition), I have also an opportunity of showing you the German work, and stating, on the authority of Dr. Da Costa, that the American publishers, Lippincott, Grambo & Co., finding that it would involve an immense outlay to illustrate the work in this country, wrote to the German publishing house for all

the cuts used in their edition, and that these were promptly forwarded and used. It is only necessary to compare the illustrations in the *German* and *American editions* of Kölliker with those in the Dental Cosmos to see the exact resemblance they bear to each other.

In addition to my own investigations, which had been submitted to the Association, as further evidence of the accuracy of the objectionable engraving, I have seen in the library of the Academy of Natural Sciences of Philadelphia, in Siebold und Kölliker, Zeitschrift fur Wissenschaftliche Zoologie for 1850, a paper by Dr. Johann Czermak, with illustrations of the *interglobular spaces.*

As the man who has constructed any article is far better qualified to describe its mechanism than one who has no part in forming it, I would call upon Dr. G. S. Allan (a gentleman who has probably prepared and mounted more microscopical specimens than any other in our profession in this country), and upon Dr. J. S. Dodge, Jr., to give their views upon the subject under discussion.

Dr. ATKINSON. There are two kinds of honesty. One is spontaneous and gushing from the heart; and the other is the after-thought of policy. The credit given so ostentatiously before this learned body ought to have been given in the first number of the gentleman's article which he published. His note to his article upon the researches upon the microscopy of the tooth were in a subsequent number of the Cosmos. That is all I have to say to that. Whatever Dr. McQuillen may have placed over his signature concerning the interglobular spaces, the Dental Cosmos will show. If I am wrong, I desire to be put right. What we wish to get at is something more determined than mere thought or mere feeling. Inspiration gives us ideas; ideas perfected become thought; thought becomes opinion; and opinion becomes belief. We respect opinion a little, we respect belief a good deal, — but knowledge we adore.

Dr. McQuillen. In so far as the remarks of the last speaker are meant to intimate a failure on my part to give due credit in the Dental Cosmos for quotations and engravings, I would say that in the first part of the address alluded to credit was given in the body of the article to a cut taken from Prof. Leidy's work, and to still further satisfy the most hypercritical reader, a foot-note was appended to the continuation in the next number of the magazine, in which additional acknowledgments were made. I will not inquire into the motive which prompted such a remark, as it is quite transparent; I have always endeavored to make due acknowledgment to every one: my record is before the profession, and must stand for what it is worth.

Dr. Barker (Phil.). We are all too apt to be governed by authors of known and well-deserved reputation, but every one should search out with the microscope for himself for these phenomena. I believe that this discussion will tend to produce that result, and therefore think it may be productive of good. The question as to the presence of these interglobular spaces being indicative of a normal or abnormal condition is not a very important one, as even the advocates of the latter view did not contend that they acted as a predisposing cause of disease, except caries had first worked its way to their neighborhood.

Dr. Allan (Newburg, N. Y.). At the request of Dr. McQuillen, I will make a few remarks on the interglobular spaces. As I understood the question this morning, it was a matter of some doubt whether they existed, or whether there was a mistake in the drawing in not maintaining the proportions. These spaces do exist, and it is very rare in cutting into a six years molar not to see them. If you will examine the spaces in a carefully prepared section in balsam you will notice they have a dark, opaque appearance. Now apply heat, melt the balsam and allow it to permeate the section, and the spaces will clear up and you can detect them only by their outline. You thus prove their existence, — that they were filled with air at first

and then with balsam. I will read, in support of my statements, the following extract from Kölliker's Microscopical Anatomy:

"In the crown they (the interglobular spaces) are found most frequently in the neighborhood of the enamel, and often formed a thin, curved layer, extending along its whole inner surface, which, upon close examination, is seen to be composed of a multitude of thin layers receiving the ends of the contour lines. They also occur however, more *internally*, but always in longitudinal sections in lines which correspond with the contour lines." . . . "The interglobular spaces, whose presence is normal in developing teeth, contain during life, not fluid, as might at first be expected, but a soft substance resembling tooth cartilage, and possessing a canaliculated structure like the dentine itself."

The tubes being in almost all cases filled with air, might in appearance be compared to a dark tube held before a glass plate, a person at a distance could not tell whether the tube was in front or rear of plate or whether there were two plates of glass and the tube between them. Therefore I say that although a great many of the tubes may pass through this interglobular space, it is difficult to demonstrate the fact, and I think impossible. These as represented by Kölliker, are within a little distance from the enamel, and only a very little in any other portion. You may find them, however, near the cementum, and near the line of junction of the cementum with the dentine. They are very common, and you meet them in almost all sections of six-year-old molars.

Dr. Dodge (New York). Before I ever heard of such a thing as interglobular space, I had noticed these appearances which are presented under the microscope; and since I have heard of them, I have observed them over again carefully, in sections of deciduous teeth. The appearances which I have drawn roughly on the black-board are those which I have seen. [Dr. D. illus-

trated his remarks in this connection by referring to diagrams upon the black-board.] In examining one of these sections, beginning at the outside of the tooth (I will not be particular about drawing the enamel), I find for a certain distance the usual formation of dentine. Then inside of that comes a layer which presents a very different appearance. Instead of purely dentinal tubules (though I do not believe they are tubes), there is an appearance that looks more like a tangled growth of thorn bushes. They make an angle and are more wavy, but they are not sufficiently plain to be traced to a distinct point of termination, but seem to present the general appearance of a multiplication and turning. I am going to tell you what I have seen, and then what I have thought; but I am going to state first simply what I have seen, and separate what I know from what I think a thing may be. Near the pulp cavity there is not that line which you find in the completed tooth. On the contrary, these dentinal tubules stick out, some being longer and some shorter. But they show that they are a substance which projects. Yet, although you have got an edge of projection, it is not an even edge. It resembles a brush that has been unevenly worn. And among what would represent the bristles, are curved markings, like segments of imperfect circles. This structure gives rise to what are called the interglobular spaces; all that is not globular is interglobular. I ask you to observe that this is a long way from the enamel. Gentlemen have spoken from the beginning of these spaces being near the line that joins the dentine and the enamel. I have not found them best marked there, though I have seen the two specimens exhibited by Dr. McQuillen.

Dr. Spaulding (St. Louis). I would like to ask as to the frequency of these spaces through the teeth in general.

Dr. Dodge. These markings are numerous in general along this edge and on the margin towards the pulp. In more than one specimen that I have made, there were particles which were

not attached to the edge, but had been loosened, either by the grinding or by subsequent heat. Among this substance lie very peculiar bodies which puzzled me for a while, and they look like this. [Drawing little discs on the blackboard.] Sometimes these discs are pierced with holes through the centre, and frequently half of such a hole is found on the edge, so that it is suggested to you that if there were another one it would just complete the hole. The discs are just about the same size, on an average, as the circular markings within this tissue. I would say further, as coming under my observation, that in these deciduous teeth there occur frequently slight markings in parts of the dentine which seem to be formed. There appears to be nothing but the elements by which you might inscribe a perfect circle. They occur frequently, but not at all in the manner in which they appear in the nearer portion. These things are what I have seen. Now I will trouble you with what I have inferred from them. My inferences are that this layer of dentine had not attained a perfect solidification. It was in one of its formative stages when the tooth was extracted, and of course all ceased at that point. These dark lines are the half-formed dentinal tubules, but they are not completed and perfected; and that is the reason of their projecting irregularly. These are not like the calcified portion of the dentine, but, as you would expect, a semi-solid body. Now in this part begins the process of calcification, and it takes place in nodules. I am not sure but that I am repeating the idea that Dr. Atkinson has put forth, but at any rate I was familiar with it before I heard it from any other source. Of course, when you make a section of one of these nodules, it will be circular. The sections of these, pierced by the holes which furnish a passage to the half-formed dentinal tubules, are what lie loose around the edge, owing to the attrition of the grinding process, or separated by the action of the heat in the mounting of the specimens. As

the process goes on, these globules approach each other, and the tubules lose their inosculating branches; and when the process goes on to a thorough completion, these nodules coalesce, and there is left no space between them. But, supposing that nutrition be stopped, these spaces will be left between the nodules, there being no vital power to fill up the interstices. Then will remain the interglobular spaces; and these are never bounded by anything like a continuous line, but by segments of circles, more or less. You will notice that the spaces here (see illustration page 358) are rounded by just those lines found in the aggregation of globules. They do not come into perfect contact everywhere. There is in one place a globule almost isolated. The course of this line is turned out here, and hollowed out there and so on. And the artist, an entirely unprejudiced witness, it strikes me, has most perfectly demonstrated that these are not air globules. They are formed by no defect in the mounting of the specimens, but they are spaces between the coalescing globules of the dentine. And so it is that these nodules always show the sweep of the curve, which you will find capable of being carried around to a circle, and generally of a regular size. It appears, then, that this condition is essentially a formative one; that it is the natural and necessary condition through which all dentine passes at one stage or another of its growth; that it is a normal condition of the dentine; and that it is found in an imperfect state of calcification in the teeth. But it should not be considered anything out of the regular course; for except that it is unfinished it is natural, and not an exceptional formation *per se*. I think it is really important as a matter of science, when we want to get at the truth, to discriminate between arrested development and something entirely abnormal and out of the way.

Dr. TAFT (Cincinnati). The subject of dental physiology is a very important one, and one in which are grouped a great many things. But so far one very small point has occupied

almost all the discussion. It is very interesting to us all, but the discussion has been centred upon the one peculiarity of the anatomic structure of dentine. But then there are other portions of this subject which are equally important. The subject of dental physiology, or all physiology, includes in general, the development, growth, nutrition, use and character of the organs. I do not propose to enter into a discussion of this subject. But I wish to refer to one thing out of which the greater part of this discussion has arisen; and that is a vagueness of expression or of terms. Take for example the term abnormal, and perhaps there would be as many shades of definition as persons who attempted to describe it. One person says the space which is found in certain portions of the dentine, and which drew out this discussion first, are abnormal. What is meant by that? What are we to understand by the assertion that these spaces are abnormal? Or if they are normal, what are we to understand by it? There was some action perhaps, in the development of this tissue, or in dentine presenting an appearance like this, which is to be considered aside from this tissue. There was a cause for it; some would say abnormal, and others might say normal. Now then, if a deficient point exists in dentine, there was a cause for it sometime. It might occur from some particular disease occurring at the time of its formation, or from something not so tangible. It might occur from mere want of vital energy or formative power at the time of development without any special diseased condition. When the latter occurs would it be abnormal? Some would answer affirmatively, others negatively. There are almost as many varieties of teeth as there are teeth existing; why is this? Are they all abnormal, or are the greater portion of them abnormal? There are a great variety of appearances presented by these structures, just as there is everywhere else in organic tissue. You will scarcely find any two specimens that will present the same appearance. There is much importance con-

nected with this subject, inasmuch as the durability of the teeth depends upon their structure.

Dr. Spalding (St. Louis). I do not propose to go into the discussion of what constitute predisposing causes of decay, but I do wish to say a single word upon that particular point of the subject which relates to the fact, that these interglobular spaces have been called a predisposing cause. If I understand these spaces, they are no cause, predisposing or otherwise, of decay, until the disease has progressed to a certain extent, and has also penetrated to a considerable distance. After the disease has made considerable progress, and when the decay, reaching through the enamel, comes to these spaces, disintegrating and decomposing influences may come in, I admit, and facilitate its progress. I do not pretend to dispute that. In these spaces an increased surface is presented for chemical action. The disease may assume an increased ratio of progress when it reaches this point. But that the existence of these spaces is really a predisposing cause of decay, a cause which induces disease, is a position which I wish to dispute.

DENTAL PATHOLOGY AND SURGERY.

Dr. Kennicott (Chicago). I wish to say a word or two in regard to the mistakes of the medical fraternity, in the diagnosis and treatment of diseases arising from a pathological condition of the teeth.

Nothing is more common than to see physicians treating odontalgia, and facial neuralgia, arising from irritation in the oral cavity, constitutionally, and it is almost the universal custom with a certain class of the profession to treat "ague in the face" (alveolar abscess) with large doses of Dover's powders and bread-and-milk poultices.

I will say nothing at present of the unaccountable itching of the palms of young M.D.'s to be "pulling the wrong tooth" with a pair of old rusty turnkeys, for that is absolute charlatanism, and they know it. But what I have to complain of is, not that they steal our thunder, but that they don't make a proper use of it.

Theoretically it has become customary with physicians to abandon this class of diseases to the dentist, as belonging to our specialty. If they would do so practically, it would be more creditable to themselves, and far better for all concerned; or, if they would fully qualify themselves to treat these cases, by appointing special lecturers upon dental pathology and surgery in their colleges, I cannot say that I should object. But thus to abandon the study of an important class of diseases, and still essay to treat them is a disgrace to the healing art, and merits our emphatic condemnation.

I will mention a case or two of the character that we very often meet with, by way of illustration, and to show that I am

not scolding our brethren of the Lancet without just provocation.

About a year ago a lady patient, by way of apology for being late, mentioned that she had been watching with a friend who had been brought very low, and was still suffering "most cruelly," from neuralgia. A little inquiry elicited the fact, that the person — a lady — had been confined to her bed seven or eight weeks, with facial neuralgia; that she was under the care and treatment of an eminent physician, — a professor in one of our medical colleges, — who, having exhausted his resources, had at last notified the family of the patient that he feared the case would terminate fatally. After hearing the history of the case, I remarked that the disease undoubtedly depended upon local irritation, and that all the constitutional remedies in the world would not help it. The next day I was called upon by the attendant physician, and asked to see the case. I immediately accompanied the doctor to the bedside of the patient, who was suffering from incessant shocks of neuralgia in the head and face, which were greatly aggravated by the slightest disturbance. There was a bright red spot on the left cheek, accompanied with considerable heat. Upon examining the mouth, I found that the superior bicuspid teeth upon that side, had produced abscesses, which after wasting a large part of the adjacent gums and alveolus by absorption, had finally opened into the antrum, producing extensive ulceration of that cavity. The mouth was generally in a very diseased condition. Large quantities of salivary calculus incrusted the teeth, and the gums were highly inflamed and suppurative. My friend the Doctor said, he had at first attributed the red spot upon the cheek to pulmonary disease, but latterly had diagnosed "*polypus of the antrum.*" I recommended the immediate removal of the diseased teeth and necrosed bone, but the Doctor said he did not believe the patient could endure the operation. I suggested anæsthetics, but was met by the objection, that in the patient's very low condition, chloroform

or nitrous oxide would certainly kill her. It being the wish of the patient's friends, I assumed the responsibility, and performed the operation under the influence of chloroform, removing the bicuspids and also two badly diseased lateral incisors.

The physician remained and assisted in the operation, although he fully expected, as he subsequently informed me, that it would terminate fatally. After the operation I could pass my finger into the antrum through the opening made by removing the teeth and necrosed bone. This enabled me to demonstrate to the Doctor that the "polypus," which he had diagnosed, existed only in his imagination. The patient readily recovered from the effects of the chloroform, and for five hours subsequent to the operation there was no return of the neuralgia.

I mention this case, gentlemen, not because it is so very remarkable, but because it is a type of the cases that come under our observation almost daily; and illustrates also the extreme proneness of the medical fraternity, even the best of them, to travel out of their legitimate sphere, and thereby fall into these terrible mistakes.

The subsequent history of the case is, that the patient rapidly recovered, and is now entirely well, although she undoubtedly possessed a temperament peculiarly liable to attacks of this disease.

I will mention one other case which occurred in my practice many years ago, having the same general relations to the subject, but which at the same time, conveys a salutary lesson to those of our own profession.

An eminent physician in the city of Milwaukee, was treating a lady for scrofulous disease. The patient had scirrhous swelling of the glands of the face, which was at times very painful, producing the usual appearance of "king's evil." She had been using iodine, under the direction of the physician for a long time, producing a very repulsive and unsightly appearance of her

face. One day she called upon me for some professional services, and while undergoing an operation, requested me to handle her face carefully, as it was sore and painful. I obtained permission to examine the swelling, which was located apparently in the sublingual gland, and felt hard and rough, unlike any living tissue. By pressing the tumor upwards, and holding the tongue to one side, I could readily see a dark gray substance through the thin membrane covering it, which I at once concluded was a salivary calculus. I had very little difficulty in convincing the lady that my suspicions were correct, and obtained permission to remove the "tumor," which proved to be an enormous calculus, three-fourths of an inch long and about half an inch wide. It only remains to be added that her scrofula (?) healed of its own accord, without any further application of iodine, or any other therapeutic treatment.

The lesson that we may draw from this case, gentlemen, consists in the fact that this lady had suffered the loss of all her back teeth, at the hands of *our* profession, in the endeavor to cure a neuralgic affection, arising directly from irritation produced by this foreign substance in the sublingual gland.

Dr. MILLER, (Worcester, Mass.) I rise at this moment to say that the gentleman who has just taken his seat brings a charge against the medical profession in general; — that is to say, sir, we are called upon to notice how ignorant they are in cases of neuralgia. We claim to be a branch of the medical profession. Now I submit whether it tends to good feeling to indulge in these assertions. True they do not understand all the relations of dentistry which we do, nor do we understand the diseases of the eye and ear as fully as we do dentistry. I submit that they may not be so well qualified to treat all these diseases, facial neuralgia for instance, as some of us who have made it a special study; but it strikes me, that in the discussions which shall take place upon these various subjects, it may be well as a matter of courtesy to treat them as associates and not to hold up

their ignorance on any particular point so as to make them seem ridiculous.

Dr. KNAPP (New Orleans). I will mention a case that occurred under my observation a short time ago. Two ladies visited my office, having been recommended to me by an aurist who was treating one of them. I was told that she was requested to come to me to have the nerve of a certain tooth destroyed. I found that there was no pulp, and that the tooth was already suppurating. I gave the lady chloroform and extracted the tooth. The lady accompanying the one for whom I had extracted the tooth saying that the latter had begun to hear, I went to see her, and found that she could hear as well as she ever did. And I am curious to make inquiry of any gentleman as to the cause of this rapid restoration of hearing; for as I told her, I expected to relieve the pain from the tooth as a foreign body, but I had no conception of the relief to the ear. The aurist called upon me soon after the operation and inquired if I had really killed the nerve, and upon learning from me that I had extracted the tooth, he expressed himself as being very sorry that I had extracted it, as he feared that it would interfere with his treatment of the ear. I replied that very likely it would, inasmuch as the lady could hear then as well as she ever could.

Dr. FITCH (New York). The subject of dental pathology is one of practical value to us all. It has many phases, but still it has its well defined and circumscribed lines of treatment, so that we may not be mistaken in reference to our procedure in any case that may come before us for consultation or treatment. I wish to mention a case that came into my hands some months since. A patient presented herself to me who had four abscesses. The one to which I wish to allude, was an abscess involving the left bicuspids and left eye-tooth. The other abscesses yielded readily to treatment. This particular one gave me considerable trouble, because it continued to discharge sanies and pus; at one time pus, and another time sanies. The abscess was of nineteen

years standing. Whenever these abscesses pointed upon the gum, the dentist had simply punctured them and said they would soon be better. He had continued this practice about eighteen years, without discovering that it was a matter of more serious nature than a simple alveolar abscess. I introduced a probe and found that it was a case of necrosis involving the superior maxillary bone, the floor of the antrum and the nasal process of the superior maxillary. I immediately proceeded to the removal of the necrosed portions. This I affected by scraping the diseased surfaces with an instrument, and by an application of remedial agents to these surfaces.

[An inquiry was here made as to the means of distinguishing between the healthy and necrosed surface of bone.]

Dr. FITCH. This can be done by gently scraping the bone with an instrument. In passing over a necrosed surface with an instrument it will seem rough instead of smooth, soft and velvety in its feeling; you can readily tell by the touch. I scraped the surface thoroughly until I got fresh blood; I then made an application of iodine and creosote. This is a powerful escharotic, and rapidly destroys the living structure, and should be used with caution. This remedy increases the action of the part, and the line of demacration is thus established between the living and dead tissue; by this means we soon get rid of the necrosed bone. After treating this case some weeks, I secured healthy granulations from the diseased surfaces, and succeeded in reproducing the parts lost.

[It was inquired as to what length of time this treatment was continued.]

Dr. FITCH. In the case just described the treatment was continued near seven months before the parts were restored to health and the patient discharged.

I was some three months in removing all the necrosed bone. Treatment must always be determined by the condition of the parts medicated. No rule therefore, can be given just how many

times this or that agent must be employed. After the parts commenced to granulate, the remedies used should be very mild. The object of treatment at this stage, is to preserve the exudate thrown out upon the granulating surface, in order that it may form new structnre. In the case under consideration the antrum of Highmore was involved, and had to be treated.

After washing out this cavity with a very weak solution of the chloride of zinc. the method of procedure was simply to dry the cavity by taking a piece of bibulous paper, and wiping it out until it was dry; then dress either with wine of opium simply or with tincture of cantharides, or some such simple preparation. At each visit medicate and dry out the cavity, and fill the fistulous opening with cotton until the next call. When the antrum is closed, simply apply a dressing to protect the exudation. The tooth under treatment, of course, had a cavity in it, and the cause of the abcess was the death of the pulp. The root of the tooth, in these cases, should be thoroughly cleansed. When periodontal inflammation sets in, you should never proceed to fill the root, but wait until it subsides. This lady's temperament was nervo-sanguineous. She had an active temperament that responded readily to medication and still there was that lack of persistency, toughness, and endurance which we find in persons of other temperaments. She had no particular cachexia so far as I ascertained. I put her under a treatment of iodide of potassium, giving her pretty heroic doses at first; I think I gave her about forty grains a day for a few days, until I got a constitutional result. I here dropped down on my remedy. The action of this remedy is to produce a solution of the parts, so that we get cellular action. It is necessary to induce a systemic condition for producing this cellular development. As soon as I could, however, I put her upon hypophosphite of iron as a tonic. Her general health improved rapidly. I could mention other cases; but allow me to say to you that this treatment involves a knowledge of the whole range of diseases that the system may

be heir to. No man can take one disease and make that a criterion; he must be able to judge of any particular case. It may and often does require a change of treatment. Hence the propriety and the necessity of an education upon the general principles of medical science, so that we may diagnose our cases and treat them properly. Each case has marked characteristics which fully define it. We want to know just the kind of treatment required, and when we have done enough, and there stop. I am happy to see that the dental profession is waking up on this question, and advancing in the cultivation of the specialties of medical knowledge.

The inquiry was made whether it was necessary in the surgical treatment of these cases to remove that part of the root which was necrosed.

Dr. FITCH. I will answer by saying that if we find a cyst at the point of the root we must remove it either with an escharotic or an instrument If a rough place is left by the action of the pus, we must scrape that point down and make it smooth, so that it will not act as an irritant. We must leave no irritant there. The parts will naturally become healthy although the tooth may be devitalized. Before I sit down, I will say that there is no necessity in one case in a hundred for the extraction of a tooth for the treatment of this disease.

Dr. SUESSEROTT, (Chambersburg, Pa.) I join with Dr. Kennicott in his regret that so little is known of dental pathology by the dental profession in general. Yet I think it would be well not to make too sweeping assertions in regard to the blunders of the medical profession, without doing something to suppress the blunders that we have in our own specialty. We shall find very few who are absolutely infallible in this particular branch of medical science, and we could find a great many in our profession who are illegitimate members of it. And we find that the blunders that are made by our profession are so numerous that we could pile them up one upon top of the other.

There is no doubt in my mind that it is eminently proper that all dentists should acquaint themselves thoroughly, not only with the pathology of the dental organs, but be able to enter into the treatment of the various cases which come up in connection with it; although, if you listen to the learned dissertations upon the subject of the treatment of dental diseases, you will occasionally hear of blunders of those most fitted to instruct us. As the subject of neuralgia has been spoken of, I will give an instance in which as a medical man I was consulted, and I only learned the true condition of the case by accident, and I doubt whether many medical men, under the circumstances, would have done much better. A gentleman almost eighty years of age presented himself to me to be treated for the most severe attacks of neuralgia that I ever witnessed. The paroxysms were so violent as to deprive him of reason. The trouble was confined principally to the course of the fifth pair of nerves, yet his entire system was becoming affected. I examined his mouth; he had no teeth. I inferred, however, that as he had lost his teeth, he had lost them gradually, and that there had been disease of the roots of the teeth, and that this had produced irritation along the courses of the nerves, and that this was still kept up, aggravated by the feeble condition of the patient. He desired me to take his case in hand. I commenced by putting an issue upon his neck, in order to avoid irritation. The nerve branches could be traced by the sensations of pain which he experienced. He would tell you at once when you came to the fifth branch. I applied a strong preparation of narcotine. In a few days more his violent symptoms returned. I continued to treat him for more than two weeks, before my attention was directed more particularly to his stomach, I found that his stomach was not all right, and I commenced an entirely different mode of treatment, giving him such advice as I thought proper in the treatment of his stomach, and the patient was finally restored, and lived three years, and at last died of apoplexy.

Dr. COLBURN, (Newark, N. J.) The remark has been made that we extract too many teeth which ought not to be extracted. Until within a short time I have been guilty of taking out thousands of teeth just because they happened to be ulcerated. None of you as surgeons would think of taking off the whole finger because there happens to be a sore on it. Then why extract a tooth because there is an ulcer on it.? One simple thing will affect a cure of which you all know, the simple preparation of creosote. Thus many a valuable organ may be saved that otherwise would be removed. In connection with using escharotics, I wish to present an instrument which I have found valuable in preventing the escharotic from getting upon the other parts of the mouth. I have had occasion to notice streaks across the lips from the use of creosote. This instrument will be found valuable in avoiding this.

Dr. ATKINSON (New York). There has been something said as to the advances of men in knowledge. I always feel as if I knew next to nothing when I come into the clear and quiet presence of the demonstration of a specialty by the man who has dwelt upon it so as to give a clear demonstration. When we feel so despised in our own hearts, then is the time, while we are in this nascent condition, that we are ready to be borne into a better light. There is then an effort to do something. We know but in part, and if we take the successive steps, adding to our knowledge, and being careful that we do not lose that which we have already obtained, we may be able to call it out under the inspiration of the moment, and do something towards eliminating the truth of the equation which is presented us. Now when we compare what we know with what we do not know, we may well place our hands on our mouths, and our mouths in the dust. I have taken an M. D. myself. And God knows how sad I was, and how mad I was to feel my ignorance when I took it. If we could just come to the blessed truth and enjoy it always without let or hindrance, and be cleansed in our hearts,

we would not be led in paths that leave us in the dark; but the rough ways would be made smooth, and we should see and walk together, and our hearts would be warmed in love towards each other and with desire to do good. Details of cases are sometimes regarded as invidious, and personalities I have been called to account for making. I take it however, that when a personality is really the representation of a principle, it ceases to be a personality. I wish to make reference to a case which is a representative case. It was a case of death of the pulp of the superior central incisor. The tooth began to project below its fellow by the deposit of super-oxidized hydrate of carbon, and the patient was not pleased with the appearance of it, and called on a dentist, telling him that she felt that the tooth was what is generally thought to be dead. The dentist said, — No, not at all. And he begins to file, and files it off to a level. And this was repeatedly done. The patient informed me that there was no sensibility in the tooth, and she believed that it was dead. Subsequently the tooth became discolored, and an abscess formed, and she became disgusted with the dental profession generally, and applied to a professional surgeon who stands at the head of his profession. He treated the case for disease of the antrum. He took his instrument and entered the antrum and found it in its natural condition, but takes one of Squib's cones of nitrate of silver and pierced into the hole and enlarged it, and sent the patient home, — cured as he said. Subsequent inflammation came on, and the tooth was extracted. For fourteen years the patient was under the care of this surgeon, having abscess after abscess. And I apprehend that she was made worse by his treatment, and that nature would have been a better manager of the whole thing. This lady called on her surgeon two years ago, and he said that he did not think there was any trouble which nature would not take care of; and yet pus and sanies were oozing into the mouth, and the patient was neither comfortable nor healthy. He told

her to go home. She came again, however, and was sent back three times. A friend, however, had heard of another individual, and gave her a letter of introduction; but, instead of calling upon him, she went again to the surgeon, but finally got disgusted, and she concluded to go to another person. And this other person said that he should be glad to do something for her, and an exploratory operation was made for three days, and it consisted in removing the dead and dying bone exactly after the manner which Dr. Fitch has just spoken of. The patient was anxious for a prognosis of the case. That individual, who did not know much about the case, said that it would take about eighteen months to complete the cure, and that it would be necessary that the patient should be under his immediate care daily for a time. However, it so happened that she was able to return to her home in one day short of three weeks, after the removal of the alveolar borders and obtaining a perfect reproduction of bone, except a cavity at the site of the right superior lateral incisor (one-quarter of an inch deep on its anterior, and one-eighth of an inch on its posterior aspect), filled with transparent colloid mass, on which the print of the rugæ of the finger remained, the evidence that further treatment was unnecessary. That portion of the bone which was already dead, was divided, from the alveoli to the periosteum, by a thin narrow file, and enucleated with a spud from the soft parts, and then readily removed by pliers. That portion of the bone which was in a dying state was rubbed down with a burr that was cut like a rasp or file, until the living bone was reached. After this, the debris of bone was carefully washed out with a syringe charged with warm water, in which were a few drops of tincture of arnica; then a solution of chloride of zinc (twenty grains to the ounce of water) was thoroughly thrown into all the windings of the chasms from which the dead parts had been removed. Simple arnica water, on pledgets of cotton as large as the pocket was desired to be,

reduced from day to day, as the colloid exudate filled up the cavity, completed the cure in the unexpectedly short time which I have mentioned. The only constitutional treatment resorted to consisted of full doses of the bromides of potassium and ammonium, to which were added a few grains of sulphate of quinine.

Dr. McQuillen. There is too much of a disposition on the part of the people to be physicked, and of some medical men and dentists to physic them to their hearts' content. Certain gentlemen of my acquaintance evidently have, for instance, creosote and iodine on the brain, for with them these agents apparently do everything, and nature next to nothing. Prof. Holmes, who has facetiously named this truly classic city of Boston, "Hubtown," drew down upon him, a short time back, the anathemas of all the legalized quacks in the land, for daring to assert that, with some few exceptions, "if the materia medica, *as now used*, could be sunk to the bottom of the sea, it would be all the better for mankind, and all the worse for the fishes." For saying this he has been subjected to misapprehension and misrepresentation on the part of some good men; but what he there objected to was the *abuse*, not the *proper use* of drugs; and in that opinion every rational person, be he patient or practitioner, must unite. If all practitioners were more careful in impressing upon the minds of their patients the necessity of a strict observance of hygienic laws, and the latter more disposed to follow them, there would be much less suffering in the world, and less occasion for the use of drugs in the treatment of disease. For my own part, I rely more upon diet and rest, judicious exercise, bathing, clothing, protection from extremes of temperature, etc., than the pharmacopœia. In illustration of this I will cite the case of a distinguished advocate, whose professional duties were so exacting as to require the utmost application on his part. This gentleman

called upon me during the extreme cold weather of last winter, desiring relief from intense and constant neuralgic pain in the right side of the face, which was aggravated by the slightest movement on the part of the lower jaw, or exposure to the cold air. Having examined his teeth carefully, and found that they were not the cause of trouble, the patient was informed of the fact, and that possibly the pain was due to irritation of some remote part of the nervous system, which the mind instinctively referred to a locality where no disturbance existed, or it might be owing to an osseous tumor pressing upon one of the branches of the fifth pair of nerves, or compression of them, in passing through one of the foramina, from osteal or periosteal thickening. I believed, however, that excessive professional labor, defective assimilation of food, combined with exposure to an extremely depressed temperature, which drove the blood from the external surface of the body back upon the nerve centres, had more to do with the difficulty than anything else. The patient was advised to rest from his professional duties, pay attention to his diet, obtain all protection possible from warm clothing, and in particular to seek, for the time being, if practicable, a more genial climate. A trip to Cuba was taken, and the gentleman returned greatly benefited in every respect, and relieved in particular from his intense neuralgic pains. That they may return, is of course possible, but there have been no painful manifestations up to the present time.

Dr. Butler, (Cleveland, Ohio.) What I have to say is in reference to the same point of which Prof. McQuillen has been speaking. It is only a little additional testimony in the same direction. Last winter a patient came under my notice, who had been in the hands of three of the best physicians in our state, suffering from facial neuralgia; and the pain was of that sharp and intense character, coming on by paroxysms, especially when she attempted to take any kind of nourishment, she could not take solid food at all, and even an attempt at swallowing

was accompanied with pain, and consequently she refrained from taking food for weeks; so much so that her friends feared she might become deranged, and in fact, she was partially so. I was called to see the case, in order to make an examination of her teeth, as it was suggested by the attending physician that there might be some offending tooth, and that it would be well to send for the family dentist. I made some examination, and found two teeth which were in a condition evidently requiring their removal. We administered ether, and the teeth were extracted. After a few days there was a little improvement in her condition, and the pain was not so extreme; but it sprang up again. The patient went back and forth, first to one physician, and then to another, and then back to me. Every time that I saw her, I made the inquiry as to her food, for there seemed to be something wanting, and she said that she could not take any nourishment. I insisted that she must take nourishment, even if it was of the fluid character, in order that the nervous action might be called off in a different direction; for it seemed that there was no mode of treatment which would relieve her; and it went on for more than a week before I could induce her to take any food. Her friends said that she must make the effort, but she refrained for some days, seemingly from a nervous pretext. Finally, I told her that she *must* take nourishment, and she did so; and from the time that she began to take nourishment, so that the stomach had something to do, the pain began to subside, and the case improved, and finally she recovered her full normal condition of health. And I attribute the cure more to the effect of the nourishment than to anything else. The system had become so exhausted when this pain came on, that, in order to get relief, the nervous action must be diverted. And it seemed that as soon as the stomach was called into action, then the work had begun in the right direction.

Dr. WETHERBEE (Boston). I rise to cite a case. It is a very simple one, and yet to determine why the cure was so

readily affected may be somewhat more difficult. The patient who was of nervo-bilious temperament, came to me for consultation, having suffered from neuralgia periodically for seven years, and not being able for that space of time to recline upon her pillow on account of the excessive pain. I was not at that time able to diagnose the case satisfactorily to myself; but suffice it to say that eight inferior teeth were extracted, and there has been no recurrence of the neuralgia up to this time. It is but fair to state that these eight teeth were not extracted with a view of curing the neuralgia, but in order to insert a set of artificial teeth; but the cure was effected. I should have mentioned the fact that the teeth were not in a diseased condition. Nevertheless my own opinion is simply that there was some irritation of the fifth pair of nerves arising from those teeth. I can account for it in no other way.

Dr. CLARK (Savannah). I wish to call the attention of this association to a species of disease, which I have seen in our locality, which has appeared more in the form of an epidemic. It appears to be confined to children between the ages of five and seven or eight years. During the last year I have seen several cases. I have been unable to adopt a preventive treatment which has succeeded in removing it. One case, I recollect, of a little girl who called on me about eight or ten months ago, to examine an inferior maxillary tooth. I advised the mother to let the case be for a few days, and to call again; but during the time she called on one of our best physicians, and he put the child under a course of mercury; that not succeeding, he tried various other agents. In the course of two or three months the mother called on me again. I examined and found a considerable discharge of pus, and the temporary teeth were slightly loose. There was, so far as I could learn on diagnosing, a very little detached bone, and I removed a piece about half as large as my thumb nail. The mouth was so offensive that I could hardly do any work. I used a disinfectant and continued

it until there was positive evidence of exfoliation of a piece of bone. I extracted the bone and teeth. One of the teeth extracted was not much affected, but I wished to remove as much of the disease as possible. I then swabbed out the cavity with creosote in a preparation of sulphate of zinc and acetate of lead. I dismissed the case, and about three weeks afterward, when I saw it again, all the indications of the disturbance had disappeared. This case illustrates three or four others, and my reason for bringing it before the association is to obtain information. I will mention another case, which was very interesting to me. During the war a soldier called upon me who had received a wound. He was wearing a gold plate with eight or ten teeth, and a bullet had passed through his cheek and knocked out his first superior molar and the inferior molar, and struck the plate on the coronal surface. He called upon me to have the plate repaired, and I found that there was quite an indentation, and that the bone had been fractured, and I advised him to have it removed. He called on me some months after this, complaining of neuralgia. I found that the second molar was slightly sensitive, and there was a little spot about as large as a pin's head which showed some discoloration. I could not recommend anything, and I proposed to extract the tooth which was affected. In a few days he called again, and I drilled the tooth and found that it was partially suppurated. I found a very large nerve cavity, but I could not get his consent to have the tooth extracted. I filled the root as far up as I dared to, suspecting that there was something wrong, at the other end. A short time afterwards he called upon me again, and I extracted the tooth, and I found to my great surprise that about a third of the root was wanting, and closer examination showed that it had been broken off at some previous period, and had been the occasion of the trouble of which he had complained.

Dr. Barker. I am satisfied from hearing the discussions and

from the reading of journals that we are apt to look for some obscure cause of disease. I indorse the remarks of Prof. McQuillen in regard to the general treatment of disease; and I will here speak of disease of the antrum. But first I desire to say something of these cases which Dr. Clark mentions. I have seen these cases, but I have never yet seen a single case where there was not a defective organization or defective nutrition, and we shall almost always find cases of that kind in our hospitals where there are cases of scrofula. Of course we can remove the material, but we want to improve the quantity and quality of the blood, and that not so much by medicine as by proper food. Passing from this subject to the consideration of diseases of the antrum and necrosis of the bone, I have been led to the conclusion that in too many cases medicine is administered to accomplish those results which can be successfully treated by allowing free exit to the abnormal secretions, and by exciting the parts to increased action. In simple affections of the antrum, which may be occasioned merely by a person's taking cold, we know that there is a secretion, and, the opening becoming closed, this secretion is retained in that cavity. By its very presence it excites the glands to an increased secretion. This secretion is abnormal in character, and is acting upon the membrane, and thus we have pain there. Now in cases of this kind, I believe that, in ninety-nine cases out of a hundred, simple remedies are the most efficacious. I have used almost all the remedies, and I have come to the frequent use of cider vinegar. I commence with one part of vinegar to eight of water, and gradually increase the strength until the whole strength of the vinegar can be used. This reduces inflammatory action, and promotes a healthy secretion, at the same time giving every exit for the passage of any abnormal secretion.

Dr. Clark. I wish to make one word of explanation. These children whom I spoke of had nothing of scrofula. Most of them were of a bilious temperament and healthy, and their parents were healthy.

Dr. KENNICOTT. We have been cautioned in regard to looking for remote causes of the disease of which we have been speaking, but I think it may be laid down as a rule that we should *first* look to the *oral* cavity for the cause of facial neuralgia. It is true, however, that in many cases this disease arises from very remote and sometimes mysterious causes. I have seen a large number of cases for instance which proved to have been caused by uterine irritation; again, it is often strictly constitutional, and I will cite one very interesting case to illustrate the extreme difficulties that sometimes stand in the way of making a correct diagnosis in this disease.

I was consulted by a strong, healthy man who was afflicted with neuralgia of the right side of the face, which had been treated by several physicians of good standing without anything more than temporary relief. He applied to me to have a tooth extracted, which his medical adviser, Prof. Freer, suspected to have some connection with the neuralgic affection. I consented to do so with the reasonable hope of affording immediate relief. This hope proved delusive, but fortunately a circumstance occurred during the operation which ultimately led to a complete cure. While in a partially delirious state from the effects of chloroform, he mentioned that he had once had his skull cracked by a blow from a rake, while endeavoring to knock down apples from a tall tree.

I reported this circumstance to Prof. Freer, who agreed with me in the opinion that in the healing of this fracture, or by a subsequent secondary growth of bone, a branch of the fifth pair of nerves was impinged upon.

To test this theory, I applied to a blistered surface over the position of the supposed fracture, a solution of aconitine in water, which promptly arrested the pain. This treatment was kept up once a day for about a week, when the patient was dismissed as cured. There was no return of the disease for several months. The man finally removed to the State of Michigan,

soon after which the neuralgia returned. The case finally fell into the hands of Prof. Flint, who, upon the hint afforded by my discovery, cut down upon and removed the impinging portion of bone, and permanently cured the disease.

Dr. Fitch. It has been said here that we should be guided by well defined principles. If we understand principles we may understand courses of treatment. I will make a few remarks upon the principle which governs me in my treatment, and I think it will cover the whole sphere of diseased action, namely, that every healthy action is a nutritive act, — nothing more and nothing less; and that every diseased action is an interference with that nutritive act; and the cause of all the disorders in the human body is an interference with the nutritive function. The nutritive function embraces two acts. What are they? The assimilation, or the taking of that which supports and builds up, and the eliminating, or the removing of that which has subserved its purpose in the economy, and if not removed becomes a poison. Now, if we arrest either one of these processes, we interfere with nutrition. In the case of those children which Dr. Clark mentioned, I have no doubt but that they were poisoned with effete matters, which affected the nerve centres (which in all cases regulate nervous force), and suspended vital action. It was a poisoning of the system, either from some agent which was left in the system, or from some thing taken into the stomach, or into the lungs, or through the skin, and which had interfered with the healthy action of these different processes. The alveolar processes are lower in vitality than other portions of the organism and are therefore, the first, to feel the shock, and yield to the disturbing force. What is the treatment? The removal of local irritants, and taking out of the system that which does not belong there, and supplying that which is lacking. I think that covers the treatment. Another thing I wish to speak of is incipient alveolar abscess. In the first place, in treating a case of this kind, I ascer-

tain if there is any exposed pulp. If I find there is not, I next look for a devitalized pulp. If I do not find that, then I go outside of the oral cavity and look for something else. I look at the stomach; for many times you will find the trouble to be in the stomach, and oftentimes in the kidneys. I ascertain if posible, in the first place what the difficulty is. If it is a devitalized pulp, cleanse the root thoroughly. The patient may object and say that the pain is intense about that tooth; or it may be a heavy, dull pain. I cleanse the root however. My object is to get down to the living structure of the part. I go through the root with a broach. If there is matter there, I let it out and probe until I draw blood. Then my treatment is either counter irritation, or cutting off the supply of nervous force. It has been said that if you can control the nervous forces, you can control the inflammation. To cut off the nervous forces, I use an anæsthetic agent applied to the tooth or gum or both. After I have probed the tooth-cavity I take a syringe and inject a few drops of the tincture of aconite into the root, and in a moment the tooth becomes easy. I have anæsthetized the part, and the man goes away relieved. Perhaps a little cotton with tincture of aconite may be put upon the gum. Be careful how much you use. You must not use heroic doses. It is a powerful arterial sedative. Better use an ointment of subacetate of lead (*Goulard's cerate*) and aconite, say five grains of the extract of aconite to one ounce of cerate, and put that ointment over the part of the face affected, and it will keep the part quiet. If you have a local irritant, you must remove that, no matter what it may be. If it is from the stomach, you must direct the treatment to the part. The patient may object, but you must show that you cannot do anything with the case unless you do so. Sometimes an abscess will form and break. When it does so form, use the lance freely and cleanse out the part. Cleanse out the root thoroughly and see that you get a healthy action there. I would not treat it much. Treat it mildly. As soon as you get the tooth free from odor, fill it. Now I have given you the whole

thing in a nut shell. If the disease involves the socket, I would treat it as I would any other inflamed part. If it was at the point of the root, I would extend treatment to this point and cleanse it, and secure healthy action.

Dr. CLARK. Last summer, at Chicago, I read a paper upon the class of teeth which has just been mentioned. We are all too willing to speak of those cases with which we are familiar. We have other cases which puzzle us, of which these men who have been practising for eight or ten years are afraid to speak. I allude to those cases where there is a perfect devitalization of the pulp, and no apparent discharge. This class of teeth are like a powder magazine; the minute you probe them, inflammation will take place. There is a discharge in this case, but it is almost imperceptible. We commence with our nerve-cavity-instrument, and clear out the roots. And in doing so, we are very liable to choke up the end of the root. Now, to prevent that, my course has been simply to remove as much of the detached portion as I can at the first sitting. I then use the acetate of lead. At the next sitting I may use creosote. At the third sitting I can go on without fear. I hardly ever have trouble now in one case in twenty, whereas I used to have in nineteen out of twenty, which is certainly quite a difference. Some fifteen years ago I noticed a pivot tooth which had been filled with wood, and for some fifteen years no decay took place. I asked myself whether that would not be a better substance for filling than metal. And my practice now is this. After cleaning out the root, I take a soft piece of orange wood, and after cutting it down to as near the shape of the root as I can, I insert it as far as I can into the cavity, and see where the pressure has been the most, and relieve it there. After getting it properly fitted, I remove it, and reproduce it from a piece of hickory, and cut this three-fourths off. I force this home, and fill over it with gold. It has been stated in the Cosmos that it was

not a perfect filling. This is a mistake. I have seen cases where the wood filled up the cavity properly.

Dr. ALLPORT. This method of treating pulp cavities is not as common as might be imagined, yet it is by no means new. It is quite old, and was practised by Dr. William H. Kennicott, of Chicago, twenty-five years ago.

Dr. LAWRENCE (Lowell). Roots were filled in this way with wood as long ago as 1838.

Dr. FITCH. In regard to the cases presented by Dr. Clark it is a matter of no consequence with what the root is filled, provided that the substance is not corruptible, and provided that it seals the root hermetically.

MECHANICAL DENTISTRY.

Dr. KINGSLEY (New York). I wish to protest against the habit of standing committees reporting upon things with which we are all familiar on mechanical dentistry; the time of this Association has been taken up with what purports to be a report on that branch of our science, and which was nothing more or less than an abridgment of a well-known text-book. I hope in future the reports of standing committees will be confined to those things which will be of benefit to the association. So far as I can remember there was nothing in the report that was new to the profession. The use of aluminum as a base for plates, comes up now in a new shape; I should like to have seen some report on that; again, there was nothing said as to the appliances for irregularity of the natural teeth, one of the most interesting and necessary subjects. I mention these points which the report has failed to notice, that discussion may be evoked; another thing to be considered, is the manufacture of artificial teeth; these are not made to comply with that artistic

taste, which appreciates the full development of the teeth. It is a common remark, that you can tell a set of artificial teeth as far as you can see them; they are totally lacking in character. I hope these points will be freely discussed, and from this time to the adjournment the time will be taken up in practical matters.

Dr. CLARK (Savannah). I was surprised to see so much of the report given to the rubber question. I came here to see the different improvements in mechanical dentistry brought properly before this association. While here, I have seen some valuable improvements in practical science, and am sorry there have been no allusions to them in the reports of committees. My own experience with rubber, has been that it was too light. I suggested to Dr. Richardson, that there should be some means of making it heavier. I have seen in the exhibition rooms, a plate which overcomes this defect. I have examined some beautiful specimens of artificial obturators. This has not been brought before the Association. They fill a very important gap in the requirements of our profession, and one to which we all ought to pay attention. I should like to have seen these obturators brought before this Association, for they have shed a great deal of light on that subject for me.

Dr. CHAMBERLIN (Framingham). Much inconvenience has been experienced from the expansion of plaster in setting. I have overcome this tendency, by mixing my plaster with water in which has been dissolved sulphate of potash in the proportion of three or four drachms to the quart of water; an excess of potash can do no harm, only causing a slightly alkaline taste. I present casts showing the expansion of plaster when mixed with pure water, and the result when the solution of potash is used.

Dr. MILLS (Brooklyn). We have been complained of at times, for failure in mechanical dentistry; but when we come here, those men who can instruct us in these matters do not do so. I would like to have Dr. Kingsley give us more in detail his methods for correcting irregularities of the teeth.

TREATMENT OF IRREGULARITY.

Dr. KINGSLEY. I shall be happy to respond to the invitation of Dr. Mills. I am here without models and without special preparation. I cannot speak before an audience of this kind with satisfaction without models. One of the principal things to be borne in mind is simplicity of arrangement in appliances for the mouth. Reduce the appliance to the simplest thing possible to accomplish the purpose. In the treatment of irregularities, I presume that almost every variety of deformity has been successfully treated by others, and I do not therefore claim for myself any originality in that respect, that is, for having treated things that never were treated before. [Dr. K. here drew upon the blackboard a diagram of the upper jaw, representing the incisors very considerably in advance of their proper position, so much so as to give a pointed appearance to the lip, and giving a triangular appearance to the contour of the teeth.] The superior central incisors, in the case which I am representing, projected beyond the lower ones very much indeed. The breadth of the jaw was unusual. The point which I wish to make is this: not to spread this jaw; but to bring the jaw back again to its proper form, in the shortest possible time, and with the simplest appliances, and with the least trouble to myself. Bear in mind these three points. It is better to give a little more care and attention to the case at the start, so that we may be relieved of constant trouble in attending to it afterwards. If it is possible, make an appliance so that patients may take care of it themselves. Impress upon patients the principle which is at work, that they may attend to the appliance themselves, and judge of its operation. Now to the appliance. In this particular case, I fitted a rubber plate which was made on a plaster mould, as any other rubber plate would be made; but the plaster mould is made from a plaster impression, which I consider essen-

tial. I care nothing about how irregular the teeth may be; I say use plaster for the impression. You say to me that it will break. That is just what I want. Put in plaster; hold it until the plaster in your vessel shows that the plaster will fracture, and not mash. Take your impression out, and you will break it. That is just the thing you want. Replace the pieces in the right places, and you will get an absolutely perfect mould, so far at least as it is possible for science and art to obtain. In sticking the pieces together I use sometimes wax, but oftener the liquid silex. The silex is sufficient for the purpose of sticking together the impression; but if you have not got it, use wax. The pieces in the inside will be bound by those outside, so that it does not interfere with the perfection of the model to be cast. Make your model and vulcanize your plate, which is nothing more than a plate running around these parts. Make the plate just as delicate as strength and durability will permit. Don't fill up the mouth with material to interfere with the articulation. I will not discuss the propriety of fitting them in very closely; so that they may be, as it were, sprung into their place. I would in such cases as this prefer to use a clasp made of gold.

Question. Would you insert an air-chamber?

Dr. Kingsley. No, sir; I never have found air-chambers and clasps to agree. I cut away the plate opposite the incisors, so that there may be room for them to be pressed in; and this pressure which is brought to bear directly upon the incisors will act more or less upon the whole arch. This pressure is brought to bear by means of a very simple contrivance, a piece of gold is formed in the shape of a T, about a quarter of an inch in length, and with a staple or ring at the bottom of the upright portion of the T, through which a ligature may be passed. This ligature is made of rubber, and may be cut from small rubber tubing, this rubber ring is passed through the eyelet in the T, and then attached to the plate, reaching directly to the second molars on either side. The plate being introduced into the

mouth, the T is brought forward and passed between the central incisors, so that the cross-bar of the T will be brought to bear upon their labial surfaces. If the incisors are in close contact, make room by wedging. The effect of this contrivance will be to draw the central incisors inward and at the same time to force the side teeth outward. This strain must tell somewhere, and its effects are felt all through in this direction. The patient in this case was a girl of fourteen years of age. In seven weeks from the time of introducing this appliance, the teeth were brought into their proper position, and the arch was made just as near perfect as any I have seen. I cannot say what was the cause of this freak, or what drove them into this wrong position, but when nature has a chance to assert her sway, the result will be that the teeth will return to their proper places. The only additional treatment which is necessary is the use of a close-fitting retaining plate, which must be worn for a number of months after the first plate is removed. The patient must be charged to remove and cleanse it often. To prevent the incisors from returning to their abnormal position, delicate rubber rings may be used, being slipped over the incisors and attached to the plate.

Question. How would you treat a case where the superior lateral incisors articulate within the arch of the lower teeth and are locked in?

Dr. Kingsley. There are various ways of treating a case of this kind, but I think the most simple and effective method is to make use of a gold band running across the labial surfaces of the incisors to which rubber ligatures should be attached, embracing the lateral incisors which you wish to bring into their proper places. Sometimes such a band is supported at its ends by tying with floss silk to the molars or bicuspids; but a more convenient way, when admissible is to carry the ends of the gold band as far as the first bicuspid on either side, thence over its crown and palatal surface to be imbedded in a rubber plate

reaching across the roof of the mouth. This makes a support for the band, which can be more readily removed than when it is tied on. With such a fixture but very few weeks are required to bring the teeth into position. There is no necessity of building up the molars to prevent occlusion during the process; the patient will not close the jaws enough to prevent the movement of the laterals; sometimes they will make the passage in a single night. There is little danger of their going too fast. Mr. Tomes of London, in a case where a tooth had become turned in its socket, took his forceps and brought the tooth back to its place at one twist with the instrument. If such heroic treatment as this is safe (and there seems to be no question in regard to it), I am sure we do not need to apprehend much danger from too sudden movements with our appliances. Another case which came under my observation was that of a girl thirteen years of age, who had inherited very large teeth. She was small in stature, and did not seem to have attained her full growth. Her parents had large teeth; but in her case the teeth looked so extraordinarily large as to be of themselves almost a deformity. And they had come through the gums in almost every direction, so far as the superior incisors were concerned. I was at a loss how to treat such a case, and so I waited, going upon the principle, if I was not perfectly clear what course to pursue, of standing still and doing nothing. The upper teeth were very large, stood forward, protruding very much from the jaw, and were, in fact, almost horizontal. The upper lip rolled over and curled up upon itself, while the lower lip was covered by the upper teeth. It was with difficulty that the lips could be brought together over the teeth. The deformity was great, and the family expression which was great in other features was destroyed. As the teeth were all in contact with each other, with generally good articulation, and only lacking a little of sufficient breadth in the superior arch, I deemed it impossible to spread the arch enough to bring the teeth back to

their proper places, and that if it were possible I might add another deformity by attempting it. After weeks of consideration, I decided to remove the first bicuspids on each side. I then prepared to draw the front teeth back by ligatures attached to a plate running across the roof of the mouth. This seemed to work well for a few days, but I soon foresaw that if this only were accomplished, I should have the incisors greatly elongated and the cuspidati inclining backward. I then stuck up a gold plate over the six front teeth, and soldered studs about a half inch in length on the anterior surface, one against each lateral. To the ends of these studs, which projected just beyond the lip, were attached with a movable joint, brass straps which passed up over the cheeks forward of the ears, emding in a hook. A leathern skull-cap was made to cover the crown of the head and reached down to nearly meet these straps with a hook sewed on each side. The skull-cap and mouth fixture were then connected with strong india-rubber ligatures caught over these hooks. The appliance was so made that it could be taken off easily by the patient. In addition to this external apparatus the internal fixture, as before described, was also used, so that there was a strong upward and backward movement obtained from the combination. The result was that within five months the six front teeth were carried back to the second bicuspids, and driven up into their sockets nearly one third of the length of their crown. The deformity was entirely corrected and the family expression of the mouth restored. I have plaster models which will show the measurements.

Dr. SHEFFIELD (New London) called attention to a case in which he was endeavoring to enlarge the arch of the lower jaw.

Dr. KINGSLEY. I consider the extension of the arch of the lower jaw one of the most difficult things to do, as there is so little room for applying any contrivances suitable and effective.

Dr. FITCH. What treatment would be thought best in a case where the second molars did not touch, the first molars were three lines apart, the bicuspids were four lines apart, the wisdom teeth only articulating, and the teeth fully developed and of the proper length?

Dr. KINGSLEY. The very fact of there being wisdom teeth would show that the subject was of that age that any operation would not be likely to be successful. If it were the second molars instead of the wisdom teeth, I should put on the straps in substantially the same manner as in the case which I have mentioned. I believe that a continued pressure in the right direction must ultimately lead, not only to absorption in that direction, but to a perfectly correct articulation. Using these molars as a fulcrum, I believe that, if the case is taken at a sufficiently early age, the defect can be remedied.

Dr. BARKER (Philadelphia). I want to bring out a subject of a little more intricate character. Suppose that we have a case where the central incisors are out of the line of the arch, the lateral incisors in position, and the cuspidati outside of the arch and with only the half of their crowns protruding, each superior bicuspid so situated that the lower one closes on its inside and with only half space enough for the cuspidati between the laterals and first bicuspids. The question is how to bring the cuspidati into place without extracting any of the teeth. My method in this case has been to use a rubber plate (similar to the one described by Dr. Kingsley, except that I use no clasps) and to attach the rubber ligature to the central incisors, and to pass a strong silk thread around the cuspidati, and work it into position with a delicate instrument and tie securely. The silk ligature serves two purposes; it produces sufficient irritation to promote the further presentation of the tooth, and it allows the rubber tubing to be secured in position without slipping off. After fastening the elastic ligature, a pressure is brought against the first bicuspids, pressing them outward and backward at the

same time that the cuspidati are drawn inward. Ligatures should not, however, be applied to the cuspidati before the roots are sufficiently developed. This point is generally reached as soon as the crowns are half protruded. Teeth may be drawn into position, by the means which have been described here, in six or eight weeks. The correction of irregularities of this kind demands a careful study of the law of forces, in order to make the appliances used as simple and effective as possible.

Dr. McKellops (St. Louis). I have made use of a plate similar to the one which has been described, except that the plate did not extend forward of the bicuspids.

Dr. Kennicott (Chicago). In cases where the cuspidati were but partially protruded, a retaining point should be drilled in the enamel, to allow a screw to be set in or a knob of gold to be built out, around which a ligature might be fastened.

Dr. Atkinson (New York). I have listened with interest to the discussions upon the subject of mechanical appliances; but have heard statements made as facts, which if they are facts, there are very unpleasant facts which would follow from them. It should be taken into account whether a tooth is fully erupted or not, before these appliances which have been referred to, could be properly used; and, oftentimes, sufficient attention is not given to the configuration of the face. In cases where the teeth were not fully erupted, the plan suggested by Dr. Kennicott seemed to be the only common-sense plan, but the utmost circumspection is needed in the application of ligatures, inasmuch as any long continued pressure upon the dental ligament is destructive both to the membrane and the tooth itself. Before a tooth can be changed from its position and retained in a new one, the bony case must be absorbed and a new deposit obtained.

Dr. Allport (Chicago). I have used hickory pins, passing through holes in the plate, for obtaining pressure against the teeth, and ligatures for drawing them in.

Dr. Colburn (Jersey City). I have used a rubber plate which is held in place securely by its nice adaptation to the teeth and the palatine surface of the mouth. From the centre of this plate, on a line with the tooth to be operated upon, is a standard of rubber, perforated to receive and support a rod of gold, silver, or platina, with a screw-thread cut upon its end for a nut of hard rubber or wood, which can be turned outward toward the tooth or inward toward the centre of the mouth. Pressure is created on the inner surface of the tooth by daily turning the rod a little in that direction; and a ligature from the tooth to the rod forward of the nut, which is then to be gradually turned inward, will create sufficient tension to draw the tooth into position.

Dr. Taft (Cincinnati). I prefer, before all others, a regulating plate, such as is made by Dr. Redman of Cincinnati. It consists of a rubber cap, covering the palatal arch and exterior surfaces of the teeth, which is thus firmly fixed in the mouth; cut away the plate in the direction in which any tooth is to be moved, and insert wedges of wood, thrust through holes in the plate, bearing upon the tooth from without or within. The patient is able to put this plate off or on, or change the wedges. I consider this the best thing of its kind; it requires no ligatures, is rapid in its action, and there can be no mistake about moving any tooth just in the direction required. It operates in half the time of other appliances which I have tried. One great advantage is that the patient can himself remove the plate and keep it clean. It is not essential that a regulating plate should be worn constantly; it may be removed for a short time when necessary.

APPLIANCE FOR CLEFT PALATE.

Dr. Kingsley (New York). Up to the time that we adjourned I was defending myself from the implications that I had kept my process secret. I think that that matter has been carried

far enough and that you are all satisfied on that point. I have no disposition to pursue it. I will take up this subject, and just as carefully and minutely as it is possible I will detail it, unless you desire it should be passed over in more general terms. My intention and my desire is to give you all you wish to know on the subject, and if time will permit, nothing shall be slurred over or withheld.

I shall presuppose that you are acquainted with the matter to some extent, and must therefore take some things for granted. If I presume too much you will be kind enough to check me, and call my attention to it, and I will explain as I go along. Although I had a personal acquaintance with Doctor Stearns, I must say, without intending to cast any reflections upon him, that those things which he knew, in my interviews with him, he seemed to take for granted that I knew. I did not know them, and I did not therefore obtain so much knowledge from him as might have been expected. It took me a long time to learn them, and it was not till after treating more than one case, or half a dozen cases, that I discovered just what must be done or the principles which governed the whole affair, and which, if you understand fully, all the rest is comparatively easy work. After that, it is only necessary that you should be skilful in manipulation. I take the position, that any man who possesses sufficient mechanical ability to become master of this profession can carry this thing through, if he is told what points to avoid and wherein he might possibly fail. Many of these things I have not known until within the last two or three years, and some not until within a few months. They have impressed themselves upon my mind as the result of an experience with a large number of cases. I have been misled from time to time considerably. Frequently where an appliance seemed to be just right, and so far as its acting was concerned, was all right, and which seemed to prove some particular principle, in after times I found it was under an exceptional rule. "It takes more than two swallows to make

a summer," and it takes more than two cases to prove a principle. I can only wonder that with so few cases as I had up to the meeting of the American Dental Convention at Saratoga in 1863, they should have proved as successful as they were. I can only wonder now that I was on the right track.

I shall not call your attention to the operation of staphylorraphy, except as I may allude to it incidentally. I will only say that the closing of the fissure by a surgical operation, no matter how skilfully it is performed, and no matter how perfectly the union is made, I believe to be in almost all cases a failure. It may be a surgical success but it is a practical failure. The objects for which it is attempted are not obtained. If I could go into this matter I could bring many cases proving this position. I believe now almost every surgeon of eminence concedes the point and also gives to the dental mechanician the credit of having proved that this operation is no longer necessary. The only object to be obtained in the treatment of these cases is to improve the articulation or speech. That is more or less defective in every case naturally. With certain organs of speech defective there is great difficulty in ever learning to articulate a language. This is especially the case when certain organs that are considered essential to articulation are absent. When we come to look into the mechanical process of articulation we find it is produced by the voice or sound issuing from the glottis, and manipulated by the organs between that point and the lips inclusive, and to a certain extent, the nostrils, although but very few sounds in our language are affected by the muscles which contract the nostrils. All the organs between the glottis and the lips inclusive, are more or less concerned in articulation. The palate, I believe, possesses a more powerful influence over articulation than any other organ, unless it may be the tongue; and perhaps nearly or quite as much as that organ, for it is the tongue coming in contact with the palate working against and articulating with it, thus breaking up the voice this way and that,

which gives variety; and these different sounds come to be understood as language. There are but very few sounds aside from the vowel sounds, which the palate does not exercise a powerful control over. I will not enumerate them to you,—time will not permit; but a most instructive lecture can be made upon this branch of the subject. The palate therefore does exercise an influence over the voice to make it into articulate language. There are some exceptions to this rule, and the exceptions must always be taken into consideration, when you are at a loss to account for certain things you see and hear.

That all the organs of speech must be perfect or speech will be imperfect, is the general rule. We hear ventriloquists talk, they are an exception. How they speak, we do not know. That there are some other organs trained to take the place of the usual organs of speech, is manifest, and articulate sound is the result. Again, the loss of the palate or the loss of the tongue, or some other one organ, will not entirely destroy this power where it has once been possessed. In these instances we find that some other organs have been trained, and that they perform a sort of vicarious action, and good articulate speech is the result. These, also, are exceptions. I find cases where, by all the laws of the general rule I have stated, I would not expect to understand a word the individual uttered, and the fact has been exactly contrary. I have found that to be the fact in one of the worst cases of Cleft Palate I ever saw. Everything seemed to indicate the impossibility of distinct articulation, and yet, this individual could talk and read so clearly that you would never lose the train of thought. You would be likely to attribute the defect to some other cause than the enormous deformity which existed. In this case some other organs must have been trained to perform these functions. On the other hand I have seen simple bifurcation of the uvula, where speech was so defective that you would lose all track of what the patient was speaking about, but as a rule, the greater the

loss of the parts, the more difficult the articulation. Now, what we are called upon to do, is to supply the loss. I need not refer you to the attempt made in the olden times to fill this fissure by the use of unyielding substances. That subject is more or less familiar to you. I consider it almost a physical impossibility to restore the power of articulation to an individual who has such a deformity, by an unyielding or nonelastic appliance. The only material which can be successfully employed at this time, is elastic rubber. The form best adapted to this purpose gave me much solicitude for years. I conceived if I filled up the fissure extending back to the termination of the uvula, I had done all that could be expected. I endeavored to make an appliance which merely restored, as far as possible, the lost parts and no further. I supposed the results desired must follow. I found my mistake.

The palate must, in order to articulate, have the power to rise up until the passage to the nares is closed; I am not certain whether that closure is entirely due to the elevation of the palate, or whether, simultaneously, there is a contraction of the pharynx. I am inclined to think that the pharynx meets the palate half way.

The palate in the well formed organ is continually moving up and down, now closing the passage to the mouth, allowing the sound to pass through the nose, again opening and allowing the sound to pass both ways — then closing the passage to the nares and allowing only a passage through the mouth — again closing the passage to the nares and in conjunction with the lips, allowing the sound to accumulate in the mouth ready for an explosion. "B" is produced by the sound accumulating until this cavity is full, when opening the lips it makes "B", with "P" there is precisely the same action of every other organ except there is not the accumulation of sound that "B" exhibits. "M" passes entirely through the nose. "M" is exactly the same as "P" and "B" with this difference; all the organs are concerned in the same movement and in the same relations, but

the difference is in regard to this accumulation of sound I have described. Instead of accumulating, it continues to issue from the nose, and "M" is the result; in this operation the tongue is quiet, and has nothing to do with it. The lips and palate do the whole. If the palate is defective so it cannot close the passage to the nares, and the sound issues there, instead of accumulating to form "B," it must form "M." We must therefore in making a substitute for that lost organ make something that shall close that passage. That is the reason why the operation which has been alluded to has proved a failure. Because the newly formed organ has been so short and there was so little muscular power in it, that it could not rise enough to close that orifice. The artificial palate must be made to accomplish that purpose, and be under such control of the muscles, that it can be depressed and elevated, and permit a contraction of the sides of the fissure. It must be made so as not to be in the way of the tongue, and must have a proper curve. Without going into illustrations which might be readily drawn from musical instruments, it is sufficient to say that two musical instruments with different curves will not produce the same sound. In order to bring this, as nearly as possible to a restoration of nature, it must have the same form as nature down to the boundary of the fauces. And for this purpose I consider the base of the uvula as the boundary of the fauces.

I have in my possession an artificial palate called an "Improvement," made by a gentleman who carried it down to the termination of the uvula, and then making an arrangement so that the uvula should be drawn into it rather than hang below it. It is a physical impossibility for the person wearing it to learn to articulate clearly, perfectly, and distinctly. It may not be impossible that he may cultivate some other organ, but it is *impossible for him to do it with that appliance.* Why stop at the base of the uvula? For this reason — the uvula may be removed *to its base,* and yet articulation be not

impaired, provided the palate is still long enough to close the passage. In some cases the muscles of the uvula will draw up so that when the palate is elevated, there is a little notch at its posterior margin. You will readily understand me when I say that the base of the uvula where it is connected with the palate is the boundary of the fauces, and there is no necessity for my going below that point; I follow the curve of the natural palate down to that point and then reflect it backwards. My first instruments did not extend much beyond the boundary of the fauces, and then I made the discovery that I had stopped too short; and the very moment that I put in, for the same individual, another palate made on the new plan, I found an improvement in his articulation. The necessity for such an extension is that there is a lack of muscular power in the remnant of the velum, and where there is any like weakness in the superior constrictors of the pharynx the passage to the nares cannot be shut off. I must therefore extend it horizontally so as to be out of the way of the food, and let it terminate in a thin and delicate edge.

The posterior border is dropped a little so that when the pharynx contracts it shall come against a curved edge. I conceive such a horizontal extension as that necessary and essential, and that you cannot, with a palate short of that, produce perfection in articulation.

There is one point more in connection with the form of the instrument. While I have endeavored to impress it upon your minds that it must take the curve of the natural palate, I believe it to be necessary also that it should be so constructed that the remnant of the uvula itself shall assist in its support.

It must be made so that it shall not only cover and bridge the gap in front, but shall also reach across and bridge over the gap from behind, that the sides of this artificial palate shall embrace the sides of the fissure. To accomplish this and at the same time provide for the contraction of the sides of the fissure in

deglutition without adopting the plan of Dr. Stearns of dividing it up the middle from the posterior edge, which plan I found objectionable, caused me much solicitude for years.

The principle is that of two leaves or lamina of rubber, joined in the centre with their edges free, between which the edges of the fissured palate lie, these leaves opening upon the contraction of the fissure. I found in actual practice that it produces the same result as that portion of Stearns' palate which allows the parts to slide by each other, and that it enables an individual to swallow with perfect freedom, and fills completely the gap. All the border within the chamber of the pharynx must be made very delicate, and terminate also in a thin edge. While all the edges must be delicate to prevent irritation, all the other parts must be just as firm as they can be made, and at the same time allow an easy movement of the muscles. I desire firmness through all the central parts of the instrument because firmness is necessary that the tongue coming against it may hold on long enough to get ready for the sound. In the letter "K" the sound is made by the hard, firm pressure of the palate and the tongue in conjunction with each other, the pharnyx also acting with them; every passage is closed; they are held firmly, and simultaneously everything opens and the sound "K" is produced. If it is a flimsy affair when the tongue comes against it, it will drive it out of the way. In this connection I have found it necessary in providing for the perpendicular motion of the instrument to make it what I term "wasp-waisted" and giving it stiffness in a kind of backbone along the middle. I make the *whole* instrument of soft rubber.

My experience dictates that soft rubber is just as good to fill the fissure as any other substance; nay more, it is better than any other substance to reach above the border of the fissure at its apex. I see lying here an instrument made by M. Preterre, of Paris, which is the same as claimed by Dr. Bogue as his improvement. I have no doubt that this instrument, or one just

like it, can be worn. I do not doubt that it can accomplish some good results, but I do not believe that good and perfect articulation can be accomplished with it. Here is adopted the same plan of letting it rest upon the top of the border of the fissure at its apex, but this instrument is made of hard rubber. I first attempted the same thing, but I found that it was very troublesome; that it was not safe to depend upon; it was unyielding and would be likely to strain and irritate the parts upon which it rested by a little movement. If it was elastic it would bear more easily and yield to the strain. I never found any lack of durability in the instrument in its forward parts. It does not give out or begin to warp in that part; it is only these delicate edges that begin to give way. They warp and eventually the instrument become useless. I have shown you why I consider these delicate edges essential to the success of the instrument. You will observe in the instrument made by Preterre that the anterior part is made of hard rubber and the posterior and elastic part is attached to it by vulcanization.

That is very well as long as it lasts, but none of these things last long enough to justify so temporary an arrangement. The best rule in making all appliances is to make those that will give you the least trouble in the end, and occasion the patient the least inconvenience in wearing them. A plaster of Paris mould to vulcanize soft rubber in, is not the best, as it is difficult to obtain a good surface, they are apt to come out covered with little excrescences, which cannot be polished off. A tolerably good surface may be obtained by coating the mould with liquid silex. If any more complicated instrument is desired than this of Preterre's, which is a simple flat piece of rubber, it makes a good deal of trouble to make the plaster moulds whenever duplicates are required. Again it presupposes the necessity of having a model of the artificial palate. In my first operations I made such an original model of these instruments in hard rubber but in my later operations I found it unneces-

sary. My earlier practice was to duplicate my gutta percha pattern of a palate in hard rubber, and trim it up to the shape I wished, and polish it. So I did for a long time. I find now, as the result of further knowledge and increased skill, that it is unnecessary, that gutta percha for the first one or pattern, instead of hard rubber, is quite sufficient. If it is nicely manipulated, you can slip it out from the plaster model and go on to make the metallic casts directly from that without going to the trouble of reproducing it in hard rubber. It is because of the perishable nature of the material and the absolute necessity for their being renewed, that it is better to have a mould made of metal, properly formed and nicely made in which to vulcanize them, and then lay the mould aside for future use.

Another argument in favor of a metallic mould is, it can be given into the patient's possession, and the time has arrived when any dentist in the land can produce a duplicate from it. I have said that the soft rubber is perishable in its very nature, and that no change in form can remedy it to any extent. There is much difference in elastic rubber in this respect. This question of vulcanization is as yet but imperfectly understood. The same composition vulcanized at different times, with the same care will not always produce the same result.

A gentleman familiar with the manufacture of rubber goods, said to me, "we do not know hardly anything about the durability of rubber. A year ago a lot of our goods came back to us of inferior quality, which were made with the same care, with the same composition as the other goods, and it has cost us thousands of dollars to redeem them and make up the loss, and we have never been able to find to this day what the difficulty was."

There is a great difference in the secretions with which these appliances come in contact in different mouths. In some mouths they will give out in half the time of others.

I have had rubber from private individuals, who have made it

for me, and from various manufacturing companies, and from every place I could get it. But all my experiments do not prove any very marked difference in its quality.

Within the last six or eight months the American Hard Rubber Company have put into the market some soft rubber. When I commenced using it, I was making my artificial palates with rubber procured from the Naugatuck Rubber Company. I tried the Hard Rubber Company's compound in a number of cases, and found in almost all cases that it has given more satisfaction than anything else. It seems more durable than the other. It may not prove uniformly so in the future. Here is one made on my old plan, split up through the posterior part, with a flap to cover the opening, which was worn a year, it shows but little signs of deterioration. Some of them will only last a few months, some a year and a half. When I make two for different patients as nearly alike as I can — of the same rubber — with the same vulcanizing, in three months one may be all warped up while the other will go for a year. The American Hard Rubber Company do not give directions for vulcanizing their soft rubber. I commence at about two hundred and thirty degrees steam heat, though rarely below two hundred and forty, and allow it to run very gradually up to two hundred and sixty or two hundred and seventy degrees, at the end of four hours; I think the better plan is not to let it run so high, not above two hundred and sixty degrees, and perhaps not so long. There is, you know, a great difference in thermometers. I fancy they have given out a little quicker when they have been vulcanized more rapidly, but I have no statistics, to be absolutely certain of it. In regard to the process of making this appliance, let me say, that I believe that if you will but exercise good plain common-sense (and of course it is supposed you have all got it), that your own judgment will dictate to you what to do, without its being necessary to go into details.

I have had a variety of experience in taking impressions for

these models. Formerly I manipulated the parts to get them accustomed to the presence of the plaster. That was only necessary because I was unskilled. I can now take impressions of these parts with perfect readiness. A cool head, and a firm hand, with a perfect mastery of this point, knowing just what you design to obtain, are the chief requisites for success. Only exercise the same judgment and care that you would in any other nice operation. I used formerly to take an ordinary impression cup, and secure a partial impression, then make a model and form an impression cup adapted to the case. I went so far sometimes as to strike up an impression cup of copper. My next step was to take gutta percha and fit it up in the same form. I now take an ordinary impression cup and lengthen it at its posterior edge so that it will support the plaster under the uvula, taking care that when you have carried it up, and the teeth rest upon the cup, that this extension shall not interfere with the uvula. This extension may be made of sheet gutta percha, wax or any other convenient substance. Fill it up with plaster and introduce it in the usual manner. Occasionally I have succeeded in taking the whole impression complete, filling up the entire cavity all at one time. As soon as it will fracture, break it off. It will break right along the margin of the fissure, and the upper portion can be removed at your leisure.

I would not advise, however, to attempt too much with the first impression, but after it is obtained without much reference to its filling up the cavity above the palate, to make a cast into it, and upon this cast fit an impression cup of sheet gutta percha, with any convenient handle. This special cup will support the plaster over the entire inferior surface of the palate, including teeth, gums, etc. Cover it with plaster to which a little salt has been added to facilitate its setting, avoiding a surplus to drip in the throat, and carry it steadily, firmly and gently to its position; and as soon as set, remove it. It will be found to represent everything except the cavity beyond the border of the

fissure. If it has passed beyond the border at the apex of the fissure, it is better to trim it down. Wash the impression with a solution of soap, and prepare for the additional section by filling the cavity above the fissure with newly mixed plaster. A narrow spatula is a very convenient instrument for this purpose, and three portions of plaster are generally sufficient — one upon each side, and one in the centre. The manipulations at this period must be very rapid; and, as soon as complete, the former impression must be again introduced and brought in contact with the plaster last introduced, and held until it is set, when, on removing, it will separate at the border of the fissure, and the upper piece can be grasped with a pair of tweezers and carried backwards, until the soft border of the fissure will permit its removal, and the two sections of the impression may be joined together. It is essential that this impression shall be capable of giving a perfect model of the superior surface of the palatine bone, but it is not absolutely essential that it should represent entire all the soft palate and uvula behind.

The soft tissues, if proper care has been exercised, will be so impressed on the plaster as to indicate to a practised eye the form they take beyond where the plaster comes in contact, and by the aid of a glass for examination, and a skilful hand, the parts may be carved out with considerable accuracy; but, as their form is changeable, perfect representation is not requisite. Occasionally, however, the whole cavity posterior to the soft parts has been fully represented.

Your eye must be so practised that you can distinguish between an impression of a palate in a quiescent state, and one where the muscles have drawn it out of shape. You had better use soap to separate your model from your impression, and you will do better to make your models in sections. I have a model here in which there are no sections. When the fissure extends far forward, it is more convenient to have the

model made in pieces. In a case where the fissure extends no further forward than the posterior edge of the palatine bone, it is not essential. Take sheet gutta percha and form the pattern for the artificial palate, adapted to the plaster model, and of the exact form desired. To obtain duplicates of this pattern in rubber, proceed to make a section mould of plaster which shall surround it so that when the mould is made it will completely envelop it.

I then proceed to duplicate these pieces in type metal. I found, formerly, in making the plaster pieces all at once, and then re-producing them, that owing to the expansion of the plaster and other causes, when I got all these parts made in metal and tried to put them together, they would not fit. The course which I have found better, was to make a base on the first piece of the mould and reproduce that in metal. Then make the next piece in plaster and reproduce that in metal, and so on to the final piece; and they will generally fit together closely.

You must remember that the gutta percha pattern has an uneven surface. I am careful to make it not as thick as is desirable for the rubber duplicate. That gives me an opportunity to polish off my moulds and get a smooth surface, and also increase the thickness to the point desired. I smooth the plaster by taking a bit of rag. Be nice about this matter. Let every step be carefully taken; let all your joints be good: so that these sections will not be strongly marked in your palate. You cannot trim off these marks and make it as nice as a perfect joint. I assure you that your patient will be a great deal better pleased if the work is carefully and nicely done. The mould being completed, you have only to pack it full of rubber, which is to all intents and purposes in its action like the hard rubber compound with which you are familiar, and requires substantially the same manipulations. One point more in relation to moulds. Make them of any size you wish, but the one I

show you* is about as large as is ordinarily required. If you wish to patch the mould, you can do so with soft solder or tin. By this process you will have been enabled to produce an instrument which will go into the mouth and be admirably adapted to perform the functions of the natural palate. In order to support it and keep it from slipping down the throat, you will have to make a little adjustment. I prefer gold, because it is more delicate; though I have made many of rubber. The one of which a description was given in the pamphlet published last fall (containing the paper I read before the New York Society, together with an engraving of the instrument) was of rubber. It is not unlike the plate used to support artificial teeth. Formerly I used a tube in the palate and a key on the plate that ran through the tube. That is unnecessary. It was a good adjustment, but a better and simpler one is to have a small hole through the palate, and a gold pin with a head on top attached to the plate to push through the rubber which effectually secures it. You can detach it by pulling it off, but not without considerable force. If the relations were proper for it it needs no other support. I can only allude to the results. They are just as various as the individuals themselves. Some will in a very few weeks overcome nearly all defects, while others have not done it to this day. It all depends upon the patients; and the more I have of these cases the more thoroughly do I impress this fact upon them in advance and in substantially this language: "I can make something for you which you can wear with comfort, and which will give you the power to articulate distinctly. It therefore devolves upon you to make use of it, for articulation can only be the result of long persevering and continued practice." I throw the responsibility upon them, and they realize it in advance. Then I believe I am not to blame if they do not all succeed alike. Some of them

* About two inches square and three and a half inches long.

succeed remarkably, and some of them make very slow progress, but all show improvement under practice.

Dr. Morgan (Nashville). In a case where the operation of staphyloraphy had been performed and there was a union of the soft palate and an opening in front, what would you do with it?

Dr. Kingsley. I had just such a case as that. It had been operated upon eleven years before when the girl was seventeen years of age. There was a union of the uvula and upwards for three-quarters of an inch and anterior to that an opening which was almost three-quarters of an inch wide. She had spent months under the care of an elocutionist at various times during eleven years. But as her father told me, spoke no better than she did before. This opening had been covered with a metallic obturator just as good as could be made. My first thought was to divide the soft palate reducing it to its original form. My second thought was to leave it, for it might prove an admirable support to the artificial palate. I made a model out of a piece of paper, as a guide for an instrument adapted to this peculiar case. The piece of paper I now show you will illustrate the form and the manner of its introduction. I made an appliance which was nothing more than a comparatively straight and flat piece of rubber adapted to the case, and introduced by being passed edgewise through the opening and turned to its position. It was simply an artificial elongation of the palate made by the surgeon, and rested upon its superior surface. In a little while she would talk almost as well as the rest of us. Dr. Barker recently asked me in reference to a case he had where there is slight union. I advised the same course, although as he describes the union it is so slight that perhaps it would be preferable to open it. My case was a great success. It was piecing out the natural palate with an India rubber one.

I must beg the indulgence of this association for not pursuing this subject any farther. I am so fatigued that it is impossible for me to continue. I thank you for your kind attention.

DENTIFRICES.

Dr. Colburn (Newark). I wish to state my disappointment, that there should be a committee to take charge of dentifrices, and report upon them, and that all the report there should be rendered was a simple formula for dentifrices. I don't consider that report worthy of this association. I find there is no committee on that subject for the following years. I know of nothing of more importance to the profession and the public at large than a good report on dentifrices. We are daily asked "What kind of a dentifrice shall I use?" Now, what shall we take home from the report on dentifrices? When we are questioned as to the merits of extensively advertised preparations, what are we to say? we have learned nothing to communicate about them. It may interest the association to hear my experience with one of the most extensively advertised of these preparations,—Sozodont,—the everlasting Sozodont which is advertised on every rock and tree in the country. I come from the town where it originated, am acquainted with the gentleman who invented it, and have known the article since it was first offered to the public. Perhaps you may have seen the pamphlet with my name attached, which I may say I consider the best part of it, as it disseminates some little dental knowledge wherever it goes, some very important knowledge I may say. When that dentifrice first came out, I opposed it; I knew its component, parts, and would have nothing to do with it. Two years later I agreed to furnish the pamphlet, provided the gentleman had a first-rate article to use. I desired to know what the preparation was now, it having passed through three hands; I told the gentlemen that I must not take their say-so but I must know the ingredients of the preparation under oath; they did not wish to take their oath, but I told them they must, and finally they made affidavit of the ingredients of the article, which I have, and if you knew the ingre-

dients you would be perfectly surprised. I suppose there is hardly a member here that is in favor of it, probably because it is so extensively advertised, and therefore is called a quack preparation.

At this point the speaker was ruled out of order.

Dr. MORGAN (Nashville). I have analyzed the powders and I think they contain acid.

Dr. COLBURN. I have seen an imitation of this article that contained an acid, but it was not the genuine article; I will limit myself to that which I do know, for I used it many months in my family and on my teeth. I am not at liberty to present the recipe. It is nothing but a pure preparation of castile soap; but the peculiar form in which it is prepared I am not at liberty to divulge; I only mention this article to dispossess the minds of the dentists of the idea that it is injurious.

Dr. KNAPP (New Orleans). It is very evident that the material savors of quackery in the way it is put before the public, and in the way it is put before this body.

Dr. RIGGS (Hartford). I was in hopes to see a resolution that each and every one would discourage these nostrums. We know the reputation that was acquired by the "Balm of a Thousand Flowers," until a man in New York undertook to make an article similar. He was sued by the maker of the article. The judge, when the case came upon trial, put them upon oath to divulge the secret, and the "balm of a thousand flowers" proved to be bone potash, mixed with loaf sugar and a little castile soap. I think this "Sozodont" is the same thing only modified a little. I have seen it used, and it cut the teeth like so much acid.

Dr. SPELLMAN. It is our duty to examine these articles, and report upon them if they are injurious to the public. I would say in relation to the Sozodont that the Dental College of Ohio appointed a committee about a year ago to examine the merits and claims of this article; and the chairman, Dr. Dispeau, analyzed

the ingredients, and also made experiments upon the natural organs. In that report it will be found, that this Sozodont was so highly alkaline that it made the teeth rough, making places for deposits of foreign matter; that it gave the teeth a dingy yellow appearance; and that continued application of the same destroyed the gelatinous matter that holds the enamelled rods together, and under the microscope these rods fell down as if they were cemented on the end.

Dr. SPAULDING (St. Louis). I desire to put in a protest against the use of liquid dentifrices. The object of using the brush is friction; and, if we take these lubricating alkaline preparations, they make the brush pass so easily over the teeth that it does not do the good it was intended to do. I wish this association to express the opinion that these liquid dentifrices do more harm than good. This Sozodont is a nostrum and a humbug.

Dr. KENNICOTT (Chicago). I think we should have dentifrices antacid and that should act sufficiently by friction upon the teeth to remove the tartar.

Dr. MILLER (Worcester). We need a tonic on most gums we are called upon to treat. I use and advise a tonic antiseptic dentifrice. Take a materia medica, and you can put together such preparations as will produce a good and lasting effect upon the gums.

Dr. WETHERBEE (Boston). I desire to offer a resolution that all nostrums of a liquid form be repudiated.

Dr. KENNICOTT (Chicago). I wish to make this remark, that I believe firmly that any popular nostrum and dentifrice which is expected or calculated to cure all diseases of the gums is likely to be a most infernal humbug. Such a dentifrice cannot be made. A dentifrice should consist of an antacid, and should be a powder. Every dentist should have the brains necessary to add such therapeutics as are necessary for every individual case. If any man pretends to do more than that, he is humbugging the people, and the profession too.

Dr. Morgan (Nashville). I entirely agree with the speaker who said, that as a general thing we want tonics, and sometimes astringents. One word in regard to Sozodont. It is a vile nostrum found all over the country, and in connection with it there have been published gross libels on the profession. When it was first advertised in a paper in our place, I went to the printing office to look after it, with a determination to make whoever was responsible for it take it out of the paper. The editor informed me that they received fifty dollars a year for the publication of the little advertisement of one square, with the understanding that it was to be changed once a week; there was a long list of them sent out by parties interested in the article, and first one of these was to be published and then another, until the list was exhausted. The idea conveyed by these advertisements was, that dentists frowned upon these dentifrices because they wished patients' teeth to decay that they might have something to do.

Dr. Spaulding (St. Louis). I desire to call your attention to this advertisement which contains the libel alluded to by the previous speaker. "The world laughs in its sleeves at the efforts of a few dentists who decry the Sozodont. This is only natural since it interferes with their sales, but how ridiculous for them to show their spite when its animus is so apparent." I wish to discuss this subject in a very brief manner. I have endeavored to examine and understand this subject, and have so experimented upon it as to feel confidence in my ability to make a compound suitable for a dentifrice. I have already stated my objection to all liquid preparations designed for that purpose. But I want to say one thing more about powders. The amount of Peruvian bark in the prescription of the committee strikes me as entirely too much, upon the supposition that it is required at all. It is an unnecessary proportion to produce the medicinal effects required, and so large as to render the powder unpalatable. My objection to liquid denti-

frices is, that the most of them are composed of some alkaline substance. The idea is to introduce an alkali to neutralize the acids of the mouth; but the difficulty is, that when they are introduced the effect is to lubricate the brush, and make it pass over the teeth so easily that it never does its work well. Wherever the patient is in the habit of using soap as a dentifrice, it will be found that the teeth are not clean, and that they are not kept clean, for the very reason that the action of the brush is prevented by the soap. The object of using dentifrices at all is to assist the action of the brush. If the brush gives sufficient friction, then nothing of the kind is needed at all. The chemical and medicinal properties of dentifrices are relatively small compared with their frictional and mechanical office; and I repeat, that while the brush itself will afford sufficient friction to keep the teeth in a state of cleanliness, no dentifrice at all is required. It is the usual case however, that the accumulation of mucus and tartar upon the teeth is so large, that the amount of friction of the brush that would be required to remove it would have an injurious effect upon the gums by causing them to recede, thus injuring the teeth. And therefore it is requisite that something to assist the brush in its work shall be employed that will not act thus upon the gums. Hence in compounding, the thing for us to consider is to select a substance which shall afford that increased friction. Fortunately, we have at hand an article that does afford that increased friction, and which is entirely antacid, namely, — prepared chalk, — precipitated chalk. A single word in regard to therapeutics or medicinal properties of dentifrices. If the gums are unhealthy we can almost always point out the cause of that pathological condition, existing in the form of extraneous substances. If we remove these substances thoroughly and completely, we then remove the cause which induced that pathological condition of the gums, and having removed this cause, it is very rarely the case that the aid of any medicinal substance is needed to restore the gums to a healthy condition. I formerly lived

in the belief that it was necessary to dose the powders with Peruvian bark, stimulants, astringents, and other foreign medicinal properties; but, one by one, I have laid them aside, and some of them dropped entirely. I find that the friction of the brush itself is all the tonic required in these cases, and that there is not one case out of a hundred where you will not find the dentifrices I have named sufficient to meet all the requirements of the case. Once in a while the pathological condition of the gums requires a difference of treatment; but, when it does, it requires treatment from the hands of a dentist, and not the hands of the patient. The patient is not competent to treat the pathological condition, and I appeal to you, gentlemen, that if you will make such experiments as I have made, you will come to the same conclusion, namely: that by leaving out materia medica from dentifrices, and resting upon the mechanical and chemical properties I have alluded to, relying upon the friction of the brush to produce such tonic properties as may be necessary, you will secure the desired results.

One other point in regard to materia medica in these powders or dentifrices. While the gums are in a healthy condition, there is no need for medicines. We do not wish to prescribe for a condition, a pathological condition which does not exist, and which will never arise. There is no necessity for the introduction of prophylactics into tooth powders. I am opposed entirely to the use of medicines of every character where they are unnecessary, and especially when we are to put them forth before the community as an article for daily use, that is to come into wide consumption, and that we recommend for everybody and anybody to use. There is no necessity for the introduction of any poisons into them; indeed, these are not only unnecessary, but absolutely and actually injurious in my estimation. I believe the action of such powerful tonics and astringents is injurious to the gums themselves, and that these soft tissues will by and by decay entirely. Therefore my own experience forces me to the

conclusion that we must lay aside, entirely. these medicated powders for dental use. We must leave it for individual cases, to be applied under our own hands.

Dr. Fitch (New York). I think that a cleansing property, and one slightly antacid, are the only two properties that can be embraced in a dentifrice that we should be willing to send out for general use. Every dentist it is supposed is capable of getting up dentifrices to meet a special case. That is the only wise and proper medication. If a case comes to me, needing particular medication, I adapt my medicine to it. I do it just as I please, with a liquid or with a powder. We should not be tied up to powders. All powders are reduced to liquids in the mouth. Any man who wishes to tie himself up to powders may do so, but don't tie me up to them. I sometimes wish to use medication, that I can apply in liquid form to better advantage than in solid form. I have no confidence in dentifrices that are put out by dentists and men extraneous to the profession, setting up the claims that many of them do, of removing tartar, etc. These will be found I think capable of removing the teeth. Therefore I don't uphold, or support these dentifrices that are thrown broadcast over the country, boasting to do so and so; but I believe them to be either hurtful or of no effect whatever, and in either case an imposition upon the public,— for which reason, if for no other, they should be discountenanced and condemned by the profession. I think it a mistake for us to say liquid dentifrices, I suppose the name might be lotions. I most heartily approve of the introduction of something to the profession for general use, but I cannot countenance anything for general use unless it is a very simple preparation.

Dr. Searle (Springfield). I am very happy to indorse the remarks of Dr. Spaulding. My own theory and practice for many years has corresponded to what he has set up, and I am in favor of using polishing powder, perhaps a little stronger than any one of you would commend. I rely upon the vital power to

restore any organic lesion there may be when induced by the accumulation of any foreign matter like tartar. After the tartar is removed, I frequently say to my patients,— let me see your teeth in one week, and in the mean time use water and a brush; and here let me say that in this form, I advocate a liquid dentifrice. Water is the simplest and most efficient dentifrice we can use. Next to that I would say, if something more efficient was needed, prepared chalk; or, what I prefer to that, the finest preparation of pumice stone. I find that this has superseded my regular dentifrices almost entirely, in the choice of my patients. When I have once given it out to them as something used in my own family, or by myself, they come for more of it, preferring it to any other dentifrice. They use it as long as they need to use any powder; but I do not advocate the use of coarsely prepared pumice stone, but something finer perhaps than anything in the market. I sent to Milwaukee, and got the finest I could obtain. I do not advocate medicated powders for general use. All that we need for general use is the mechanical principle of brush, water, and some simple powder which will assist the brush in doing its work.

DENTAL EDUCATION.

Dr. Kingsley (New York). The subject of dental education seems to be one of the most important things to which our attention can be directed. Colleges are springing up over the land, and we hear a great deal said in private conversation and public assemblies about the elevation of the profession. What is meant by this? Do we not by these remarks give a sort of acknowledgment to the charge which is brought against us by refined and cultivated people, that we are not an enlightened, cultivated and scientific body, or profession? Do we not by this course acknowledge and feel this to be the fact? We cannot elevate the profession, except as we elevate its members. Is it not a noto-

rious fact, that men may start up from the very lowest walks in life, and in some cases reach the highest round in the ladder, for which they deserve all praise; and is it not equally true, that, in many instances, although they just barely reach the lowest round, by reaching that they are admitted to the ranks of the dental profession? Cannot a young man, who, neither by birth, social acquaintance, or education, is fitted for anything but the commonest walks of life, with comparatively little study and preparation, commence the practice of dentistry, and be admitted into the ranks of the dental profession, and this being the recognized fact, can we wonder that among people of culture and refinement, the profession of dentistry should be regarded to a certain extent, as low and vulgar? What is the best means of obtaining a dental education? By our dental colleges. How are they conducted? I think it can be proven that in many instances students, who were entirely unfitted for the profession by previous education or culture, have been received into the colleges, and after sixteen months of study have graduated with the degree of Doctor of Dental Surgery, and returned to the communities from whence they came, and in which their unfitness for any profession was notorious. As dentists, now do we elevate our profession in this way? By no means. We have done the very strongest thing we could, to degrade the dental profession in the estimation of educated people. While I am not in favor of any man, or any body of men, acknowledging in this country that other men are their superiors, and in general terms although we claim that we are all born equal, independent and free, and though we are so to a certain extent, yet the fact is, that there is a great distinction between men. Some have greater abilities than others, and some of inferior abilities by persevering and steady application have risen out of their "slough of despond," and fitted themselves to enter the ranks of the most refined and cultivated society. How many men are there in the profession with whom you would associate, recognizing them as refined, cultivated, and

as equals? Without enlarging upon this matter, do you not see that something must be done? that there must be a radical change? How many of the D. D. S.'s throughout the land can write a page of note paper and spell the words correctly, having the sentences grammatically composed? I know there are gentlemen here capable of following up these remarks, and bringing the discussion to a point, so that we shall all realize that we have to go to work earnestly at the very root of the evil, and start with educated young men, regarding those who are not educated as unfit for our profession.

Dr. MILLER (Worcester). We are all of us aware of the deficiency of education, which exists in the ranks of the profession as a general thing. This is in a great measure attributable to the profession itself. Our great fault seems to me to be this: we fail to recognize the necessity of a certain degree of fitness for the dental profession. We should not recognize ability in an individual to become a good dentist, simply because he may be a good mechanic. My first inquiry to one wishing to become a student is this: What have been your previous habits? What is your education? If I find that the man's education has been exceedingly limited, I say to him: You had better follow your present pursuit. If you are a good farmer, mechanic or clerk, attend to that business faithfully, unless you are willing to first educate yourself, to get a good education at least, and then put yourself under an able preceptor for not less than three years, including a course in some dental or medical college if you prefer, but the whole course of your dental education must embrace three years of close study and application. It has been my habit to reject students for a less term than three years. I say to them, If you are unwilling to do this, I am unwilling to receive you as a student. Every dentist who wishes to elevate the dental profession, the literature and practice of the profession throughout the country, should reject every applicant who is not willing to give as much time to the study of dentistry as he would devote to acquir-

ing a knowledge of the profession of medicine. The more education we can have the better, and until the profession shall put its foot firmly and squarely upon the practice of taking students for those short periods, the country will be overrun with charlatans and quacks. I trust the time is now upon us when we shall succeed in exalting the dental profession on a par with its kindred sciences, and that dentists may claim rank with practitioners of any other specialty.

Dr. COLBURN (Newark). Dental education is a subject of much importance. When a mechanic desires to construct a certain article, he looks about for the material. He selects from a certain quantity that which he considers to be the best adapted for his purpose. There is one point to consider, that of looking for the material to make dentists of. I contend that the mechanic, artist, medical man or dentist, can only be made of certain material. If it is not embraced in his organization by the all-wise Creator, that is the seeds or elements of it, I contend that all the schools or colleges in existence can never put it there. I desire to impress upon all the importance of seeing that the right material is in the man we are about to admit into our office as a student. I wish every college had a committee to examine the qualifications of those proposing to become students, before they would admit them to study in these institutions. Men must possess inherent talent to become dentists. We should examine every young man applying to study in our profession. Do you admire paintings and sculpture? Do you admire clean hands and clean finger nails? If you do not, then you cannot make a good dentist.

I think our report on dental education embodied the idea of educating the masses, as well as the dentists. I believe it was not restricted to the dentists alone; I would like to have every dental college in the land see to it to-day, that some eloquent man should go out and deliver free lectures among the people and in the public schools, on popular dentistry.

A gentleman about my size went to a public school at the solicitation of a teacher, and delivered a mere talk before the children of the school. When I arrived there, I found that the children from all the schools were invited to attend, and were present. I got up and to the best of my ability made a little speech with illustrations upon the blackboard, on the subject of the teeth and how to take care of them, and what was the result? I had parents with their children coming and saying, Doctor, my child says that you said certain things about the teeth, and I have brought him to you. That is a hint for us all. What an immense amount of good might be done by talking in this way! Some dentist or college ought to issue a dental pamphlet, which should be a part of the education of our schools; something the children might understand, and so be brought up to know something about their teeth, just as they do about mechanics, natural philosophy and chemistry. Let them know that they have got to take care of the teeth, and what they are composed of. A work of that kind should emanate from some of our dental colleges, so that it should be accepted, and become a portion of the studies of the public schools.

Dr. BARKER (Philadelphia). I regret to hear the statement that certain things would tend "to elevate the dental profession." I ever recognize a distinction between principles and the men who attempt to carry them out. The profession of dentistry has attained such a high point of development, that no intelligent or educated person would hesitate to call it a *science*, well worthy the study of the best trained minds. The credit and standing of the national currency is not injured by an occasional counterfeit note, for it represents the strength, the honor, and the justice of the nation; so the existence of uneducated and ignorant dentists cannot depreciate the truths which underlie dental science. It cannot be contended that dental colleges are all that could be desired; there are, doubtless, defects in the very best, as apparent to their Faculties as to the dental public; but there is to be

in the future, I hope, a more united front presented by the different institutions, through the medium of association and union, in the requirements necessary for graduation. If this unanimity could be attained, it would tend to do away with petty jealousies and bickerings, criminations and recriminations, which ever tend to retard progress. Dental colleges are, however, powerless, unless the dental public are with them in their efforts for advancement. One of the most serious defects in the class of men who present themselves for graduation at dental schools is, that they have not been prepared by close study and early education for the courses of lectures. Private preceptors can, in many instances, greatly improve and advance young men; and it is the duty of each one who takes office students, to demand not only that they should do a certain amount of work in the laboratory, and witness occasional operations in the chair, but that they should also devote a certain number of hours daily to close study. If this rule were observed, the classes of young men at our colleges would be enabled to grasp readily the truths and principles which are enunciated from the different chairs.

Dr. KENNICOTT (Chicago). I would ask what use is there for individual effort towards elevating the standard of dental education, while, at the same time, our colleges and associations neutralize every effort that can be made, by giving diplomas to men whom the public recognize as being utterly unworthy of it?

I will instance a case: A Western dental society elected for their president a man who testified under oath, in one of the courts of his State, which testimony is now upon record, that he had never read a dental or medical work in his life, and never entered the doors of a college or common school; and who boasted that all he did know, he had dug out of the earth with his hands; and yet that man was elected president of the local society where he lived. I am not able to make comments upon it. I refer to it simply to set others to thinking and speaking the truth upon the subject.

Dr. ALLPORT (Chicago). I believe nearly all are agreed upon the requirements of the age as to the qualifications of the dentist. Few who are well informed will deny that he should be well grounded in the principles of medicine and surgery, and be a skilful manipulator. How to attain these qualifications is the practical question. It surely cannot be done, as some do, by taking students without preliminary education, for six, twelve, or eighteen months, and then turning them out as accomplished practitioners. No young man would expect to learn to be a good shoemaker, carpenter, blacksmith or druggist in any such length of time; the public and their instructors expect and demand of them that they shall work at least three years before they can be regarded as qualified in their calling. Yet many seem to suppose that knowledge or skill in dentistry come by intuition, and that little time is necessary to be spent in learning to practise it; and some who are regarded as respectable practitioners will, for a fee, encourage young men in this idea, and discourage them from attending dental colleges. That the colleges have been remiss in their duty in not demanding a higher grade of qualification before graduating their students, none will deny; but we have good reason to believe that that practice has passed away. I am informed that during the present session of the Association, the professors present have had a joint meeting, and agreed to require a preliminary examination before matriculation, three years' pupilage, and two full courses of lectures in a dental college before graduation; and that honorary degrees shall be conferred only upon those who are truly skilled in their profession, and have practised at least ten years. This is a step in the right direction, and if our colleges are properly sustained by the profession in this position, great good will result therefrom. With this stand taken by the colleges, what course should the profession pursue? To my mind the answer is clear and self-evident. Let every dentist in the land refuse firmly to take students unless they possess the

natural tastes and qualifications, which, if properly cultivated, would enable them to become reputable practitioners; and in no case for a less term than three years, unless they will agree to attend lectures, and graduate from a dental college. If this is carried out, in ten years there will be such a reform in practice and respectability as to make ours the equal of any other of the learned professions.

Dr. WATT (Cincinnati). It might be inferred from the remarks of the last speaker that there is an agreement among the colleges in relation to the graduation of students. Gentlemen will observe there is one college not represented here, and no one quite fully represented. It is true, as has been said, that the members of the various faculties present have agreed in regard to the points stated, and that they will use their influence in the respective faculties, and we have every hope that there will be uniformity of action, and a levelling up instead of levelling down. Our first dental colleges were organized mainly by medical men. Their boards of trustees were largely composed of physicians, and many, if not all, of their professors were graduates of medicine. They endeavored to bear in mind the fact that dentistry is a specialty which should be regarded as a part of the medical profession, and so they went to work to copy the medical profession. In imitating anything that is great and grand and good, it is much easier to imitate the defects than the strong points. And so while we have copied a great many good traits of the medical profession in regard to education, we have copied some of the weak ones. That is a weak point in medical education which regards four years of medical practice as equivalent to a first course of lectures in a college, so that a man who has practised four or five years comes up and attends one course of lectures, and is entitled to an examination for a degree. That is inviting students to go out and impose on the public with an imperfect medical education. I did that. I commenced as a medical student. I intended, and never thought of anything

else but to attend two courses of lectures before I practised at all; but when I was just ready to go and attend the first course, a failure of health prostrated me, and cut me short; and, when I was well enough, I could not attend the course for want of means. I spent the next summer travelling with my preceptor and practising with him. Finally I settled in a village; and as I was out of money, instead of attending the lectures, put out a shingle, and practised there. I afterwards attended the lectures and graduated. The medical colleges invited me to this course. We have copied that defect of the medical profession, and I believe that almost every college announces that four years of constant, regular, reputable practice will be regarded as equivalent to a first course. That is a defect copied from the medical profession. I hope we shall set our common mother of the medical profession such an example as she should have set us. If a man starts with an imperfect education, with a defective training and practise five years, he ought to be required to attend three courses, where if he had had no practice at all he could graduate in two courses, and if he should practise twelve years he ought to be required to attend five courses, because it would take that time to get the errors out of him, that he might start even. I regard this as a radical defect in regard to dental education, and I hope we shall cease to invite men to go out and impose upon the public for four years, and then say to them that that is just as good as a course of lectures in our colleges.

Is it not a very doubtful compliment to our abilities to teach, to say that a four years' practice without any previous education or professional training, is equivalent to a course of lectures at our dental colleges?

Dr. KINGSLEY (New York). It occurs to me that there is one thing in connection with colleges in Europe which I presume is not generally known, and that is the qualifications required of those entering medical colleges. There is no class of men that stand so high in the estimation of the people as the medical profes-

sion. He ranks the surgeon and every other profession. Why? Formerly no man could enter the Royal Medical College without he was a graduate of a literary institution; and, more than that, he could not enter the Royal College of Physicians unless he was a graduate of either Cambridge or Oxford. A graduate of no other literary institution could be admitted to that college to commence a medical education. The result was, that after four years of preparatory education, thorough and complete, and having graduated, he was permitted to enter the medical college in which he must pursue a three years' course, and ultimately it became that medical men were the best educated men in the land. Now this has only been so modified, as to admit graduates of other institutions. With the exception of this modification, the rule in regard to the student of medicine is still in force. I feel like insisting upon such a preliminary examination as shall permit only men of education to enter the ranks of the dental profession just as far as it is possible to make that practicable. I have had frequent conversations on this subject with one of large experience and ability. "In his opinion, the system of dental education is radically wrong. We are attempting to make it popular, and to bring in students, which is the very last thing we ought to think of. The only course to pursue in the elevation of the dental profession, was to select only those who were refined, cultivated, and gentlemanly young men. They should be educated in their tastes to a full appreciation of the fine arts, certainly the mechanical arts. They should have more or less preliminary training in the handling of delicate instruments; the pencil, brush, the modeling or engravers' tools are most admirable things as a preliminary training in this way." This, is of course too radical to be all adopted; but we should adopt it just as far as it is practicable, and then carry it out. I think I may say that the colleges have agreed to adopt such a standard and such requirements, that we of the profession shall have no cause of complaint.

Dr. SPELLMAN. A retrospective view of the history of the profession will compel every one to agree with me when I assert that the dental colleges have done but little towards the education of the profession. We have been educating ourselves by contact; by bringing one man into close communication with another, and interchanging views and thoughts, thus doing away so far as we could, with this crustaceous attitude towards each other. If the code of ethics is to be lived up to, some legislative action on the part of the association is necessary, that shall secure unity of action and feeling through all classes of the profession. I should propose an amendment, to the effect that local societies, to be entitled to representation in this association, should adopt or substantially recognize its code of ethics.

Dr. KNAPP (New Orleans). While on the one hand I am sorry to say I have seen poor specimens of dental operators who are graduates of colleges, I am pained to hear the last assertion that the colleges have done little or nothing towards the advancement of dental education. I call upon all who are conversant with the facts to bear witness that on the average the graduates of dental colleges are (taking them all together) better operators than those who are not. When this fact is considered, it is obvious that they have done very much for the advancement of dental education. I agree with the other gentlemen who have spoken of the importance of impressing upon dental students the necessity of attending dental colleges, and the propriety and duty on the part of the profession of refusing to take them unless they agree to stay three or four years before entering upon the practice of dentistry.

Dr. MCQUILLEN (Philadelphia). If years of undeviating devotion of time, energies and money, in an effort to advance the cause of dental education, entitle one to express an opinion on the subject, I can claim it, and it is somewhat amusing to listen to individuals, who neither have given nor done anything as yet in that direction, commenting on the glaring deficiencies that exist, the radi-

cal reforms which are demanded, and proposing measures the impracticability of which must be apparent to the most unreflecting minds. Passing over other points, I refer in particular to the demand for a thorough classical education on the part of those applying for admission into the dental colleges. Such requirements might with great propriety be demanded in an old country like England, and, while I fully recognize the advantage and importance of a classical education, it would be perfect folly to exact that in America at the present time. The vast majority of young men in this country are compelled to commence the work of self-maintenance at a period of life when those more favored are entering college; in this way many of the most prominent and useful laborers in the arts and sciences, particularly in our own profession, have been denied such opportunities, and yet by indomitable energy and perseverance they have overcome, by self-education, every disadvantage, and stand a favorable comparison with their more fortunate compeers, either at home or abroad. It is a matter of question whether those who demand a classical education on the part of others could stand the test of an examination themselves. A good English education should be required under all circumstances.

In a highly eulogistic review of the works of Dr. Franklin by the celebrated essayist, Lord Jeffrey, he advanced the opinion that a collegiate education would have greatly interfered with the independence of investigation and reflection which was a characteristic trait of that philosopher. Although not prepared to admit the correctness of this, I consider that the case of Dr. Franklin is a remarkable illustration of what can be accomplished by men determined on self-improvement; few, very few, indeed, can hope to effect what that great man succeeded in doing, but they can, at least, try, as he did, to develop to the fullest extent the talents which have been given to them.

While admitting that there is room for improvement in the course of instruction in the dental colleges, if the profession at

large, and those who are so ready to condemn, had done in the past a tithe of their duty, or encouraged and strengthened by a hearty and liberal support the efforts of the teachers, there would be little room for complaint now. A professorial position in a dental college is no sinecure, and none but those whose hearts are in the cause would be willing to labor on, year after year, with the most inadequate pecuniary return for the time devoted, and particularly when subjected to unjust and ungenerous censure on the part of those who are constantly benefited by the exertions of the teachers. Who are the mainsprings of the associations, constantly stimulating the profession at large to renewed exertions? Strike from the records of the societies and from the pages of the magazines all that has been contributed by the members of the faculties of the colleges, and how much would be left?

A primary object with me in advocating the establishment of this Association was that it might be used as a powerful lever in elevating the standard of education, and my anticipations in this respect have not been disappointed, for the influence of this organization in promoting the formation of local societies all over the country has reacted most beneficially upon the colleges and the profession.

Every true friend of the profession must deprecate, on the part of the colleges, any other course toward each other than that generous rivalry which consists in endeavoring to accomplish the greatest amount of good for the cause of education. The misrepresentations, vituperations, and personalities, too often employed by partisan writers, injure none but those who use such weapons, for the world at large generally question the motives of interested parties under such circumstances.

Dr. HILL, (Norwalk, Conn.) The subject of dental education is one that intensely interests me. The discussions this morning have clearly developed the various views of the members present upon this subject. These views relate to dental colleges, to pre-

liminary preparation in the offices of dentists; and to preliminary education of a more general kind, as well as especial qualifications. I wish to express here my profound conviction that since the organization of dental colleges in the United States, dental education has made most rapid advances; and I wish to give credit and honor to those men who first organized and put in operation dental colleges throughout the country. The dental colleges at once raised the standard of dental education, and although now it may seem to us that that standard is not sufficiently high (and I do not say that the time has not come when it is best to revise and elevate that standard), yet those of you who were in practice at the time dental colleges first went into operation, know that their standard was far above the ordinary standard, and has lifted up the whole dental profession to it. I wish to say a few words to the members of the profession at large. Some are inclined to regard dental colleges as the cause and occasion of our trouble. I wish to state where I think the fault to a great extent lies. It lies with the profession at large; it lies at my door to the extent to which I am guilty, and at your door to the same extent. I need not here state that some of you have turned out dental students too easy and too cheap, and turned them out as practitioners, when they were scarcely prepared to enter upon a course of study as novitiates. The question before us to-day is to what extent the standard of dental education shall be lifted. I have been in practice for about thirty years, a part of that time before there was a dental college known in the world. I am perfectly conversant with the difficulties that beset the novitiate in the earlier days of our own profession, and in the earlier days of my own experience. I remember how gladly I hailed the organization of a dental college, even if it were nothing but the proof of an attempt to wipe away the stigma attached to the profession. I was regarded as though I was an unworthy member of society; and when I came to inquire

the reason, I was informed by the people that my profession, as represented by those who had preceded me, had left a most unfavorable impression upon the community in every particular, and I had to meet that prejudice and live it down as best I could. Within the last thirty years I have had four dental students; the first studied with me three years, then as a partner practised with me as long as he lived. His memory is fresh among us, and will ever be. Another is in successful practice and a member of this assembly. Another has left me and gone to the South. I have turned away many applicants who came to me to study dentistry as an easy means of getting a living. I know of gentlemen taking students for pay, retaining them for a day or month, and turning them out as dentists. I must disapprove of such a course. Let the profession bring this matter home, urge and impress upon the students the necessity of attending a collegiate course of dental education, then we shall have done our best for the elevation of the profession, and have removed to a great extent the evils of which we have complained. Instead of complaining of the dental colleges, let us take it right home to ourselves, and see to it that we do our part towards raising and elevating the standard of dental education and character.

Dr. McKellops (St. Louis). I consider this institution of the dental profession an American institution, if I may so term it. The question of education abroad has been referred to, but we know that men who have been able to pass through those institutions have had property entailed upon them, and thus they have had all the highest advantages; but in this country it is different. Here a man has power to do and act as he pleases, and our most distinguished men throughout the country, who have risen to the highest positions in the gift of the people, both as lawyers and physicians, and to eminence in the arts and sciences,—we find those men have been poor men who have passed through no collegiate course. I am in favor of giving such men

a chance; but at the same time I say that it is highly necessary and proper for all men in our profession to be educated properly. We get up here and find fault with the colleges, but there is no man who will open his hand or his pocket and extend the necessary aid to endow these institutions, and thus secure as instructors men of ability and education who have not the means to gratuitously labor for the profession. I don't like to see men who are able and possessed of the most ample means to assist the colleges withhold their assistance and yet quarrel with the colleges and say, Why don't you do so and so? We can't expect these men to work for nothing; we must aid the colleges and give them of our substance. These men have their families and their little ones to take care of, — something besides science and the profession at large to look after. It is the profession at large that is at fault, and not the colleges.

Dr. Spaulding (St. Louis). I regard dental education as the chief corner-stone upon which the superstructure of our profession is to be erected. If we fail to lay a solid foundation for that, we fail in all our subsequent efforts. We must lay a proper foundation for the superstructure of every new man that comes into our ranks; and when we do that, we place ourselves on a par with the members of every other learned profession, and then we can shoot ahead in the race. How is this to be done? The colleges, the dental colleges, will do their work; they have done it: they have been in advance of the profession all the time; and the active, energetic, whole-souled, whole-hearted men who have carried forward these improvements to the present time, have never been half paid, and have never received even the thanks of a profession so much indebted to them. Let us look at this matter, and see what we can do from this time forward. I say these colleges are not sustained, — they have not had that co-operation from the general mass of the profession which they really do deserve at our hands. In one particular point they

have not our co-operation. In the matter of private pupilage we must require our students to go through a certain course of study and preparation, to pass a certain length of pupilage in the private office, as well as in the dental college; and if every dentist would insist upon their doing that, and would set his foot down firmly, that he would take no student who would not agree to take three courses in a dental college, we would very soon see that matter right throughout the land. But just so long as we receive young men as students in our offices, and grind them out in a year or so, we throw cold water upon the whole subject of dental education. But let every member of the profession say, "I will take no man into my office who will not fit himself and who is not in a condition to graduate at a dental school." By doing this, we not only give the colleges a helping hand, but a sure basis to stand upon, and the cause of education will shoot ahead like a rocket. These institutions have the men with spirit and energy, and all they now need and want is for the profession to come up like one man, and support, sustain and strengthen them in their great work.

Dr. BARKER (Philadelphia). I do not like that a single remark made by one gentleman, should pass by without notice; and I think it my duty to take some notice of it. The remark made at that time was this: That the profession should demand from those entering its portals "the possession of a *medical* or dental degree." A diploma from a medical college would give me no assurance that the possessor had a proper knowledge of dental science. I say this with all due respect to the schools of medicine, and the many worthy dentists who have, in times past, sought for and obtained from them the best instruction then attainable. Any one familiar with medical lectures is aware that not more than three or four hours are devoted to the consideration of the structure and diseases of the teeth. Who could expect from such instruction to obtain a knowledge of the minute anatomy of the teeth, of dental physiology, pathology, therapeutics, and chemistry,

and of operative and mechanical dentistry? And yet, any practitioner, accepting a student who expects to graduate at a medical college, must be willing to assume the great responsibility of himself teaching these varied branches. That a mind so enlarged as to grasp all these specialties, and capable of imparting thorough instruction in them, exists in the dental profession, I do not believe. Those experienced in teaching in any one of these departments know that earnest and constant thought, study and research are indispensable. Recognizing these facts, I look upon the addition of a single chair of dentistry to a medical college as important and useful to the general student of medicine, but comparatively valueless to one about to enter upon dental practice. A thorough course of study, with the possession of a medical degree, should be counted as but preliminary to the course of dental lectures, if that object were in view. If, as we justly urge, dentistry is a specialty, and requires special study, let us uphold its honor and respectability by acknowledging that sufficient lustre is reflected upon its practitioners by the possession of its special degree. I honor those men who, graduates of medical and dental colleges, avoid the use of their medical degree, and adopt only that which truly represents their calling.

Dr. MILLER (Worcester). If I said so, I was certainly wrong, but I think the doctor has misunderstood me. I attended two full courses in a medical college, and let me say that the professor in the institution at that time gave us only one hour—simply one lecture of an hour in length, upon the anatomy and physiology of the teeth, that was all we had in a course of lectures of fourteen weeks. I do not wish to be understood to say that that should qualify a student to practise dentistry. I would require, and insist upon it, that he should attend two full courses in a dental college besides.

Dr. FITCH (New York). I feel much interest in the matter of dental education. My ideas are rather high, and would impose upon the student a laborious course of study. A dentist ought

to be a man of broader culture than a medical man; he should be at home in all the domain of the latter, and his own specialty besides. Dental colleges also should have all the facilities of a medical college, and their own special apartment in addition. As it is, the professorships cover too much ground, and the mass of information to be obtained needs longer time.

Dr. TAFT (Cincinnati). The struggle for advanced dental education had for some years been a single-handed fight against strong opposition; it was only lately that the profession at large has been stirred. The tendency had been to make a reputation broader than the base upon which it stands, like an inverted pyramid: the effort of the colleges was to make the foundation so broad and sure that the superstructure could take care of itself. Men usually get all the reputation they deserve, and the dental profession was no exception to this rule; if we want a higher reputation we must pursue a course that will bring it. The teachers in the profession have long felt this state of things. We want to recruit the ranks of the profession with young men who possess the characteristics of manhood in an eminent degree; whereas the most ignorant have heretofore entered in without hinderance. Of all the ten or eleven thousand dentists in the country, this Association represents not much more than a thousand, leaving all the rest to go their own way. What shall we do with them? Get into local societies all worth having, and adopt a uniform course of procedure. On those who are worthless, bring such restraints to bear that they shall be compelled to qualify themselves or give up. If local societies cannot reach them, legal enactments can. Some of the States have laws bearing upon this subject, North Carolina and Ohio among them; Missouri will enact such a law this winter probably, and other States are moving in the matter. Our efforts must rise with the demands of the day; the medical profession expect us to live up to our own claims, and there we should meet them. Though the dental colleges had not had due

encouragement, they were rapidly rising, and would soon be out of sight of those who did not march in the ranks of progress.

Dr. LAWRENCE (Lowell). I have heard the remarks that have been made. They are good. A great deal of stress has been laid upon the duties of colleges, but the duties which are under our control are anterior to these.

I believe colleges are well enough, and their professors labor hard and persistently to perform their duties in the midst of the difficulties by which they are surrounded. The greatest difficulty is further back, and regards the qualifications which a student should possess, before being accepted as such, and the course of study he should pursue previous to his college course. I think when a man applies for a position as student, that he to whom the application is made should be certain in the first place that the applicant is a man of common-sense; strong common-sense is a very great qualification. Suppose we are satisfied that the applicant is a man of good sense and of a fair intelligence. I don't care if he has even been through a college course of instruction. I would not reject him on that account. I would not consider it an insuperable objection if he graduated with honor and to the satisfaction of his friends. The next question is what shall we do with him? He is stupid as a horse is, in some other matters. He don't know what to do, and the chances are that we don't know what to set him at. We are likely to put him into the laboratory, and teach him the mysterious art of putting plaster in a bowl and stirring it with a knife. That is all very well as far as it goes, but the chances are that as far as the system of education is concerned, there is no system about it. I have prepared a resolution [see Secretary's Report, page 242] which I will simply submit for the consideration of the association, and will rest satisfied with their verdict in the matter.

Dr. WARNER. In my own State, Michigan, we adopted, last winter, a resolution that it should be deemed disreputable for any member of our association to receive a student for less

than the term of three years, nor unless he should pledge himself to attend two regular courses at a dental college. I hope all present will use their influence to have every association adopt just such a resolution as this. Then colleges will not complain of the scarcity of students.

Dr. RIGGS (Hartford). I have witnessed a good deal of self-flagellation this morning in regard to dental education. What is dental education? In times past an attendance at Oxford or Cambridge was deemed essential to be considered learned. That day has passed. In this country we have imitations of those colleges. They are barely imitations. It is like going into a railroad depot in Boston, paying for your ticket, getting into the sleeping car, and into a musty bed, going to sleep and waking up at the end of your journey without any more information than you had when you got in. In these colleges you run in the ruts of thought that everybody else has been in. Dentistry at the present day and heretofore has been rather an exception to this rule, and to this fact we owe much of the improvement there has been in the dental art. I never wish to see dental colleges bearing the same relation to the profession, that the present literary institutions do to the intelligence and learning of the people. These are mere machines that grind men out, and give them a title to teach theology, or practise medicine or law; and it is mere machinery from beginning to end. The trouble is, they introduce a chronic mode of thought, the man follows it up through life, and we seldom hear of any new discovery or invention from any of these men. But when you take a man who has on his hands the scar of the plough-handle or of some mechanical art, you will find that it is from these sources you get native talent. In an assemblage of dentists you will get a great deal of original talent, which some perhaps might call "crotchety." The name would not be misapplied. The dentist is the most crotchety fellow in any community. He is the off ox of the community, because he thinks for himself.

I hope never to see the time come when the profession shall be diverted and drawn into any particular worn channels of education in college, to the exclusion of a proper education. The man must educate himself. He must apply himself to books, to thought, and to his laboratory, working out his ideas in one branch or another. The idea of going to college to hear professors talk of a subject, and sit out every lecture of an hour and a half is all very well and pleasant, and much easier than to go in and dig for it yourself. It is the fault of the present day that the world has run mad upon lectures. Instead of the people being educated it is the reverse. They don't read at home unless it is some trashy novel. We neglect too much the means of private study. We look too much to titles and degrees. We have men who have those titles, yet they don't seem to be very brilliant. The difficulty with titles and degrees is, that those who receive them, instead of working for the good of the community, or the advancement and education of the people, seem to be reposing upon them. We cannot get them from the shelves of the libraries. If there be any particular dental education more needed than another it is a good rudimentary education at the school-house. I do not believe a man brought up in a New York parlor, who has used nothing but sketching instruments, is ever going to make a fit man to teach either the profession of dentistry or medicine. Then let us reform the old idea of colleges. Let us have a practical thing. Let us teach them self-education, self-discipline, and to regard the colleges as a mere help; then we shall find discovery after discovery from our profession, and the D.D.S.'s for the coming thirty years have got to look well to their sons to bring out as many valuable inventions and discoveries as those the plough-boys have brought out. Don't let us depend too much on these inflated institutions. They will come to be in time just what our colleges are. Simply a salaried office for some lazy professor. We want more private study, hard study in our closets. When we get that, and

depend less on sheepskins, we shall have a better class of dentists. When we begin to take men with their pockets full of money, who can buy their degrees and matriculation papers, to the exclusion of those who are unable to pay for them, there is many a one excluded that would be as brilliant an ornament to the profession as we have to-day. Let us do away with this romance for colleges and degrees, and learn to estimate men for what they know; let us open the ranks of our profession to all who may choose to enter it, whether they have graduated at a college and taken a degree, or whether they have acquired knowledge by hard laborious study while engaged in some mechanical occupation, or at the plough. In this way we shall truly elevate our profession, and free it from a superstitious romance for college education, and thereby give it the true dignity which belongs to it, and which I trust at no far distant day it will have in the estimation of all.

Dr. WETHERBEE (Boston). It is vain to argue the fact, that there are men of genius in the world, who, self-educated and without a classical education, go forth and distinguish themselves from the fact of the deep intuition which suggests to them lessons of practical utility. These are exceptional cases and not the rule, and therefore it is not to be admitted that because such a man does exist, and has succeeded well, and has distinguished himself, that it is not necessary to have colleges for the purpose of educating men who have not that intuition which other men have or have had. It is necessary that there should be colleges established, not that men are to enter them to listen to a few lectures during a session, but men who shall enter to study, and who shall add to their previous knowledge, and be made better qualified to practise the profession to which they are devoting themselves. If there were no dental colleges and no rule established by which men should be recognized by the public, then every man who pleased to put out his shingle would be recognized by the public as a doctor; now, how shall the

public distinguish between the man who is competent until this system of education shall have so deeply permeated the community at large, and by its ramifications in every direction so opened their eyes, that they shall know there are charlatans and empyrics abroad. Unless there is some such system, innocent persons are liable to imposition. I would have colleges increased for the good of the public, I would have the public require a man to show his card, and I would also have colleges only graduate such men that on their return home shall be better men, more advanced in science, more competent to meet the exigences of every case that comes under their notice, better men in every respect, professionally and socially. We ask for an elevation of the standard, and the recognition of this fact, that this is a profession that has much to do with the comfort and happiness of our fellow-men, and to which is entrusted every day very important interests belonging to the community, and to trifle with these is a sin against humanity and a sin against God; and when we shall have reached this point, and made such an advance as shall bring the community to the better recognition of D. D. S. as being of authority and being an endorsement of ability, then the community will not fall into these small traps which are sprung upon them, and which sacrifice so much of comfort, happiness and interest to the future. I hope therefore that we shall all strive inasmuch as in us lies, to advocate continually and earnestly the necessity of dental education.

Dr. Atkinson (New York). I am on the record first in my heart and understanding, and second in my pronouncement to my fellow men, for a much higher standard of education than we now have, and for a much greater division of the chairs of educational institutions. We ought to seek to establish atmospheres in which we can come, so that we may be imbued with the right kind of inquiring mind, that we may attain for ourselves a clear demonstration of knowledge. Anatomy is the foundation of all medical knowledge, as it is that from which all knowledge comes,

because it deals with primates. It has never yet had its chairs divided as they should be. We ought to have anatomy divided into four sub-divisions: first, "osteology;" second, "miology;" third, "neurology;" fourth, "splanchnology," each of which would engage a professor his full time, to simply open the door to the comprehension of the inquiring mind, during not a four months', but a six months' course; and let me here say I have done what I could to establish six months, in place of four months, for the curriculum of study in our dental institutions. If we should continue to divide and sub-divide them, we should find the first capable of being divided into bones and teeth; and these could be divided again and again, until at last a demonstration should be made, and a code of principles should be pronounced, that would be worthy of the name of "dental institutes." Dental education has much to do with the dental profession; yet if those filling the chairs were educated up to the very highest ideal possible to be pronounced at this day, we would be badly off, if our patients did not have some just apprehension of what they might righteously expect at the hands of the profession in daily practice. I would rather take two boys, fifteen years of age, with a good germ of Christian character in their hearts firmly implanted, and elect them to the chairs of the colleges, and in ten years we should have institutions such as have never been seen, and will not be until some of us go behind the curtain. What is the stimulus to go to a dental college? Some one says sheepskins, the skin of a sheep with a few cabalistic marks upon it. The great stumbling-block for young men has been that sheepskins have been accorded too much respect by the community.

We must go back to my first proposition, and make every man just what he is at heart. Then we shall have no difficulty in classifying them at once. We shall be able to say who can teach, who is willing to teach, who is teaching for ulterior purposes, who is a political wire-puller, and who has a

God-given mission to pour forth the thoughts that have been poured into him, lest he should, by retaining them, burst. If I were to be called upon to give a formula by which to establish a faculty, I should say, in the first place, Make them honest men. I would have them individuals who would not be afraid to ask for the truth — not afraid to say, "I don't know; I don't comprehend this point"; for it is when we are the least strong we have been enabled to be the "Brobdignags" of the profession. Although very little advance has been made, some men appear to be very much advanced, because the masses are so little advanced. Some men think because they have been enabled to do very fair work in their own neighborhood, that they cannot afford to go to even the poorest dental college and spend a winter there. The man who feels he has done the most, is the man who will derive the most benefit in going, and needs to go the most.

If he has followed out experiments until he has conquered the difficulties which opposed him in his practice, he will be able to digest much more than the neophytes that come to college to commence their instruction. I protest against individuals accepting positions in dental colleges for short terms, or with any purpose in view other than blessing those who come within their reach, and to pour forth upon them whatever attainments they may have.

It is no easy task to teach in these dental colleges. It is no place for a lazy man to eat his dinner, or to write D. D. S. after his name, until he shall have made that title what it purports to be, — a certificate of attainment of what the individual really has. A man who is clear in his perceptions, and does what he feels to be right, who can be hissed, and yet stand up against all opposition, and who is honest and upright in his principles, is the strongest man; we cannot knock him out of the way; and after he has got his convictions rooted in the intellect which he received from the mother who gave him birth, and who

honors him in his rebelliousness, you may attempt to impede him as much as you please: but if he has a mission to do, he will do it. Let us do our duty according to our apprehensions, and leave the consequences to Him who is able to take care of them.

Dr. KENNICOTT (Chicago). I have long been impressed with the certainty that the time would come when our specialty must be divided again. It contains too much for us to master. I believe that our specialty, as at present practised, requires greater diversity of talent than any other profession on earth. Greater indeed than is possessed by any one man out of a thousand. I have thought the profession should immediately begin to consider the question seriously of dividing our specialty into mechanical and operative dentistry, — making two separate and distinct departments. I do not believe that any one can succeed perfectly in carrying on both of these branches together. It has been practically divided with the most of our best dentists, from necessity. Those who found themselves with a practice that occupied their whole time at the chair, from necessity divided the profession, and employed a class of incompetent persons to practise the other half of the profession in their own offices. I believe that this association should take immediate steps to divide the specialty into two parts, and establish each of them upon a firm and substantial basis.

Dr. MCQUILLEN (Philadelphia). A thorough knowledge of the scientific records of the past, combined with an earnest, persistent desire and effort to enlarge the boundaries of science, by making some additions to it, are indispensable requisites on the part of those who aspire to, or assume the position of teachers in collegiate institutions; and he who lacks the former can only be compared to the blind leading the blind. The reliable and effective teacher is not to be found in the cold, pedantic professor, who, impressed with the importance of his position and person, assumes a false dignity, and a "*noli me tangere*" air, so as to keep everybody at

a distance, and prevent his shallowness from being discovered; nor yet in the long-winded declaimer, who, without system or order, pours forth a heterogeneous mass of material with the most astounding volubility; but in the constant, indefatigable student, who, thoroughly familiar with his subject-matter, endeavors to impart his information to others in the most simple, unpretentious and attractive manner possible. Recognizing that students, like children, should be well grounded in the elementary principles, such an instructor, in place of entering into details incomprehensible to the beginner, would dwell in the first place on the broad outlines of science, and show how a multiplicity of apparently isolated facts hold the most intimate and important relations with each other; and then, in a gradual and regular manner, unfold, step by step, the entire subject. There is a possibility of dividing and subdividing the departments of science taught in the colleges to such an extent that, in place of benefiting the student, it would prove greatly to his disadvantage. I have very little confidence in precocious children or men; and parents and preceptors are very apt to be disappointed in their fond expectations of such prodigies.

TREATMENT OF EXPOSED PULPS BY AMPUTATION.

Dr. Corydon Palmer. (Warren, O.) In the absence of Dr. Allport, of Chicago, I will explain his method of treating exposed pulps by amputation, and exhibit the instruments used in the operation. Dr. Allport's operation contemplates cutting away a portion of the pulp in such a manner that a lip or flap upon the upper and one upon the lower side may be brought together so as to heal by "first intention." The first instrument that I would use would have a knife-shaped end, with which I would enlarge the opening, which should be made large enough to introduce an instrument designed to operate upon the pulp, and which would be somewhat spoon-shaped upon the point.

This instrument must be very sharp and very delicate, and curved upon the face. I would then use a burr of the shape of an inverted cone, with which I would endeavor to bevel the edge of the cavity on the inner side, so as to cut away any of the edges that might be in the way of the pulp. Then another instrument is introduced with a point of silver, and so manipulated as to part and free the pulp from the walls after it is excised. Dr. Allport anticipates that, by doing that, these two edges will be attracted and come together; and after mild dressings, would fill temporarily with Hill's stopping.

Dr. KNAPP. About what portion of the pulp would be taken out?

Dr. PALMER. He does not anticipate taking out but a small portion. It is done very delicately and very nicely, so as to leave the upper portion entire, and passing this instrument around and freeing it. I have felt that I wanted this matter brought up, because it is a noble work, and, in Dr. Allport's hands, successful.

Dr. KNAPP. In about what time is it found that the pulp will heal?

Dr. PALMER. I am unable to state. I think there are some gentlemen here who saw a case at Chicago where the filling was removed, showing the action which had taken place.

Dr. KNAPP. Does Dr. Allport maintain that ossific deposit takes place?

Dr. PALMER. That is the result which he anticipates. He puts in a temporary filling until it is time to fill permanently. I should be glad, if there was time, to say more upon this subject. I have been very much interested in it, and it touches upon nice points. My own experience has been, that where the nerve is exposed in the tooth, it may be treated successfully in the manner which I have explained, since we have that beautiful addition to our catalogue of materials for filling,

known as "Hill's stopping." It is the most beautiful thing we have for a non-conductor.

Dr. KNAPP. The principal objection to this operation is, that it must necessarily be attended with considerable pain, and such as very few patients could be brought to endure. It is impossible, in cutting with any instrument, however nicely it may be made, and however nicely the operation may be performed, to avoid considerable pain. And when the enlargement is made, some bits of the dentine will be necessarily thrown off. These pieces may adhere to the pulp or remain in the pulp cavity, and their removal will be attended with considerable difficulty.

Dr. PALMER. Dr. Allport would obviate that difficulty by using a syringe charged with tepid water.

Dr. MCQUILLEN. The operation just described does not commend itself to me; on the contrary, I believe that the treatment of such a highly vascular and sensitive structure as the dental pulp, in the manner proposed, would be followed in the vast majority of instances by periodontitis and subsequent alveolar abscess. I do not think even in cases of apparent success, that "union by the first intention," as claimed by Dr. Allport, would supervene in the reparative process, as the flaps could not be formed so as to bring about the perfect adaptation of part to part demanded under such circumstances. It is a matter of decided moment that speakers and writers, when using scientific terms, should use them correctly or not at all; definite meanings are always attached to them, and their improper use is calculated not only to induce confusion, but sometimes to lead to the most deplorable results.

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